SEQUENCE LISTING

<110> Duvick, Jon
Maddox, Joyce
Gilliam, Jacob
Folkerts, Otto
Crasta, Oswald R.

<120> Compositions and Methods for Fumonisin Detoxification

<130> 35718/208255

<140> 09/882,694
<141> 2001-06-15

<150> 09/351,224
<151> 1999-07-12

<160> 33

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 1691
<212> DNA
<213> Exophiala spinifera

<220>
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<222> (0)...(0)
<223> flavin monooxygenase with intron

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ctggaggcaa catccctggg aaagcaacac gtgctttaac cttcataggc gggattgctc 1620
tctatgagca gatctgtcaa gagaaggtgg ccaattggga tgggtttgat gtgcttcatg 1680
ctccctgcta a 1691

<210> 2
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<212> DNA
<213> Exophiala spinifera

<220>
<221> CDS
<222> (1)...(1638)

<221> misc feature
<222> (0)...(0)
<223> flavin monooxygenase, fully spliced

<400> 2

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Met	Ser	Ala	Thr	Ser	Asn	Ser	Arg	Gly	Asp	Cys	Ser	Val	Ala	Cys	Asp	
1				5				10					15			

gcc	atc	atc	gtt	gga	gcc	ggc	ctc	agc	ggc	atc	tct	gct	gtg	tac	aaa	96
Ala	Ile	Ile	Val	Gly	Ala	Gly	Leu	Ser	Gly	Ile	Ser	Ala	Val	Tyr	Lys	
		20					25					30				

ttg	cga	aag	ctc	aga	ctc	aac	gcc	aaa	atc	ttc	gag	gga	gcc	ccc	gat	144
Leu	Arg	Lys	Leu	Arg	Leu	Asn	Ala	Lys	Ile	Phe	Glu	Gly	Ala	Pro	Asp	
	35					40					45					

ttt	ggc	ggc	gtc	tgg	cac	tgg	aac	cgc	tac	cct	ggc	gct	cgt	gtt	gat	192
Phe	Gly	Gly	Val	Trp	His	Trp	Asn	Arg	Tyr	Pro	Gly	Ala	Arg	Val	Asp	
	50					55					60					

tcg	gag	acg	ccc	ttc	tac	caa	ctg	aac	att	ccc	gaa	gta	tgg	aaa	gac	240
Ser	Glu	Thr	Pro	Phe	Tyr	Gln	Leu	Asn	Ile	Pro	Glu	Val	Trp	Lys	Asp	
65					70					75					80	

tgg	acc	tgg	tct	tgc	cgc	tat	cct	gac	cag	aaa	gag	ttg	ctg	tca	tat	288
Trp	Thr	Trp	Ser	Cys	Arg	Tyr	Pro	Asp	Gln	Lys	Glu	Leu	Leu	Ser	Tyr	
				85					90					95		

gtt	cac	cac	tgt	gac	aag	atc	cgg	ggc	ttg	aga	aaa	gac	gtc	tac	ttc	336
Val	His	His	Cys	Asp	Lys	Ile	Arg	Gly	Leu	Arg	Lys	Asp	Val	Tyr	Phe	
		100					105					110				

gga	gct	gag	gtg	gtt	gat	gcg	cgg	tat	gcc	aga	gat	ctg	ggc	acc	tgg	384
Gly	Ala	Glu	Val	Val	Asp	Ala	Arg	Tyr	Ala	Arg	Asp	Leu	Gly	Thr	Trp	
	115					120					125					

act	gtc	aag	acg	tcg	gct	ggc	cat	gtt	gcg	acg	gca	aag	tat	ctc	att	432
Thr	Val	Lys	Thr	Ser	Ala	Gly	His	Val	Ala	Thr	Ala	Lys	Tyr	Leu	Ile	
	130					135					140					

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ctc gct acg ggg ttg ctc cac agg aag cac act ccc gca ctc ccc ggc   480
Leu Ala Thr Gly Leu Leu His Arg Lys His Thr Pro Ala Leu Pro Gly
145                 150                 155                 160

ctc gcc gat ttc aac ggg aag gtg att cat tcg agt gcc tgg cac gaa   528
Leu Ala Asp Phe Asn Gly Lys Val Ile His Ser Ser Ala Trp His Glu
                165                 170                 175

gac ttc gac gca gag ggc cag aga gtc gcc gtc atc ggt gcc ggg gcc   576
Asp Phe Asp Ala Glu Gly Gln Arg Val Ala Val Ile Gly Ala Gly Ala
            180                 185                 190

aca agc atc cag att gtt cag gag ttg gcc aag aag gct gac cag gta   624
Thr Ser Ile Gln Ile Val Gln Glu Leu Ala Lys Lys Ala Asp Gln Val
        195                 200                 205

acc atg ttt atg cga agg ccg agc tat tgt ctg ccc atg cgg caa cga   672
Thr Met Phe Met Arg Arg Pro Ser Tyr Cys Leu Pro Met Arg Gln Arg
    210                 215                 220

acg atg gat agg aac gaa cag aca gcc tgg aag gcc tac tac ccc acg   720
Thr Met Asp Arg Asn Glu Gln Thr Ala Trp Lys Ala Tyr Tyr Pro Thr
225                 230                 235                 240

ctg ttt gaa gcg agt cga aag tct cgg att gga ttc ccg gtc cag gca   768
Leu Phe Glu Ala Ser Arg Lys Ser Arg Ile Gly Phe Pro Val Gln Ala
                245                 250                 255

ccg tcg gtt ggc atc ttt gaa gtc agc ccc gag cag cgg gag gcc tat   816
Pro Ser Val Gly Ile Phe Glu Val Ser Pro Glu Gln Arg Glu Ala Tyr
            260                 265                 270

ttc gaa gag ttg tgg gag cgt ggg gcc ttt aat ttt ctt gct tgc cag   864
Phe Glu Glu Leu Trp Glu Arg Gly Ala Phe Asn Phe Leu Ala Cys Gln
        275                 280                 285

tac cga gaa gtc atg gtt gac aaa aag gcc aac cga ctg gtc tat gac   912
Tyr Arg Glu Val Met Val Asp Lys Lys Ala Asn Arg Leu Val Tyr Asp
    290                 295                 300

ttc tgg gcc aaa aag act cga tct cgt atc gtc aat ccg gca aag aga   960
Phe Trp Ala Lys Lys Thr Arg Ser Arg Ile Val Asn Pro Ala Lys Arg
305                 310                 315                 320

gat ctc atg gct cct ctg gag ccg ccg tac tgg ttc ggt acc aag cgc  1008
Asp Leu Met Ala Pro Leu Glu Pro Pro Tyr Trp Phe Gly Thr Lys Arg
                325                 330                 335

tcc cca ctg gag agc gac tac tac gaa atg ctg gac aag ccg agc gtc  1056
Ser Pro Leu Glu Ser Asp Tyr Tyr Glu Met Leu Asp Lys Pro Ser Val
            340                 345                 350

gaa att gtg aat cta gaa caa tcg ccc att gtg gct gtt aca aag aca  1104
Glu Ile Val Asn Leu Glu Gln Ser Pro Ile Val Ala Val Thr Lys Thr
        355                 360                 365
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ggt gtg ctc ttg agt gac ggc agc aag agg gaa tgc gac acg atc gtg   1152
Gly Val Leu Leu Ser Asp Gly Ser Lys Arg Glu Cys Asp Thr Ile Val
    370                 375                 380

ctg gcg acg ggt ttc gac agt ttc act ggc tca ttg aca cat atg ggc   1200
Leu Ala Thr Gly Phe Asp Ser Phe Thr Gly Ser Leu Thr His Met Gly
385                 390                 395                 400

ttg aaa aac aag cac gga gtg gac ctg aag gag gtg tgg aaa gat ggc   1248
Leu Lys Asn Lys His Gly Val Asp Leu Lys Glu Val Trp Lys Asp Gly
                405                 410                 415

ata tct act tat atg gga gtc ttc tct cat ggc ttc ccc aat gcc ttc   1296
Ile Ser Thr Tyr Met Gly Val Phe Ser His Gly Phe Pro Asn Ala Phe
            420                 425                 430

ttc gtc gcc acg gct caa gcc ccg acc gtc ctt tcc aac ggc cca acg   1344
Phe Val Ala Thr Ala Gln Ala Pro Thr Val Leu Ser Asn Gly Pro Thr
        435                 440                 445

atc ata gaa acc caa gtc gac ttg atc gcc gat aca att gca aag ttg   1392
Ile Ile Glu Thr Gln Val Asp Leu Ile Ala Asp Thr Ile Ala Lys Leu
    450                 455                 460

gag gcc gag cac gcc acg tcc gtt gag gcg acg aaa tca gca caa gag   1440
Glu Ala Glu His Ala Thr Ser Val Glu Ala Thr Lys Ser Ala Gln Glu
465                 470                 475                 480

gca tgg tcg att atg att gcc aag atg aac gag cac act ctg ttc ccc   1488
Ala Trp Ser Ile Met Ile Ala Lys Met Asn Glu His Thr Leu Phe Pro
                485                 490                 495

ttg acg gat tcg tgg tgg act gga ggc aac atc cct ggg aaa gca aca   1536
Leu Thr Asp Ser Trp Trp Thr Gly Gly Asn Ile Pro Gly Lys Ala Thr
            500                 505                 510

cgt gct tta acc ttc ata ggc ggg att gct ctc tat gag cag atc tgt   1584
Arg Ala Leu Thr Phe Ile Gly Gly Ile Ala Leu Tyr Glu Gln Ile Cys
        515                 520                 525

caa gag aag gtg gcc aat tgg gat ggg ttt gat gtg ctt cat gct ccc   1632
Gln Glu Lys Val Ala Asn Trp Asp Gly Phe Asp Val Leu His Ala Pro
    530                 535                 540

tgc taa                                                          1638
Cys  *
545
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<210> 3
<211> 545
<212> PRT
<213> Exophiala spinifera

<400> 3

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 1               5                  10                  15
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Ala Ile Ile Val Gly Ala Gly Leu Ser Gly Ile Ser Ala Val Tyr Lys
20 25 30
Leu Arg Lys Leu Arg Leu Asn Ala Lys Ile Phe Glu Gly Ala Pro Asp
35 40 45
Phe Gly Gly Val Trp His Trp Asn Arg Tyr Pro Gly Ala Arg Val Asp
50 55 60
Ser Glu Thr Pro Phe Tyr Gln Leu Asn Ile Pro Glu Val Trp Lys Asp
65 70 75 80
Trp Thr Trp Ser Cys Arg Tyr Pro Asp Gln Lys Glu Leu Leu Ser Tyr
85 90 95
Val His His Cys Asp Lys Ile Arg Gly Leu Arg Lys Asp Val Tyr Phe
100 105 110
Gly Ala Glu Val Val Asp Ala Arg Tyr Ala Arg Asp Leu Gly Thr Trp
115 120 125
Thr Val Lys Thr Ser Ala Gly His Val Ala Thr Ala Lys Tyr Leu Ile
130 135 140
Leu Ala Thr Gly Leu Leu His Arg Lys His Thr Pro Ala Leu Pro Gly
145 150 155 160
Leu Ala Asp Phe Asn Gly Lys Val Ile His Ser Ser Ala Trp His Glu
165 170 175
Asp Phe Asp Ala Glu Gly Gln Arg Val Ala Val Ile Gly Ala Gly Ala
180 185 190
Thr Ser Ile Gln Ile Val Gln Glu Leu Ala Lys Lys Ala Asp Gln Val
195 200 205
Thr Met Phe Met Arg Arg Pro Ser Tyr Cys Leu Pro Met Arg Gln Arg
210 215 220
Thr Met Asp Arg Asn Glu Gln Thr Ala Trp Lys Ala Tyr Tyr Pro Thr
225 230 235 240
Leu Phe Glu Ala Ser Arg Lys Ser Arg Ile Gly Phe Pro Val Gln Ala
245 250 255
Pro Ser Val Gly Ile Phe Glu Val Ser Pro Glu Gln Arg Glu Ala Tyr
260 265 270
Phe Glu Glu Leu Trp Glu Arg Gly Ala Phe Asn Phe Leu Ala Cys Gln
275 280 285
Tyr Arg Glu Val Met Val Asp Lys Lys Ala Asn Arg Leu Val Tyr Asp
290 295 300
Phe Trp Ala Lys Lys Thr Arg Ser Arg Ile Val Asn Pro Ala Lys Arg
305 310 315 320
Asp Leu Met Ala Pro Leu Glu Pro Pro Tyr Trp Phe Gly Thr Lys Arg
325 330 335
Ser Pro Leu Glu Ser Asp Tyr Tyr Glu Met Leu Asp Lys Pro Ser Val
340 345 350
Glu Ile Val Asn Leu Glu Gln Ser Pro Ile Val Ala Val Thr Lys Thr
355 360 365
Gly Val Leu Leu Ser Asp Gly Ser Lys Arg Glu Cys Asp Thr Ile Val
370 375 380
Leu Ala Thr Gly Phe Asp Ser Phe Thr Gly Ser Leu Thr His Met Gly
385 390 395 400
Leu Lys Asn Lys His Gly Val Asp Leu Lys Glu Val Trp Lys Asp Gly
405 410 415
Ile Ser Thr Tyr Met Gly Val Phe Ser His Gly Phe Pro Asn Ala Phe
420 425 430
Phe Val Ala Thr Ala Gln Ala Pro Thr Val Leu Ser Asn Gly Pro Thr
435 440 445
Ile Ile Glu Thr Gln Val Asp Leu Ile Ala Asp Thr Ile Ala Lys Leu
450 455 460
Glu Ala Glu His Ala Thr Ser Val Glu Ala Thr Lys Ser Ala Gln Glu

```
465                 470                 475                 480
Ala Trp Ser Ile Met Ile Ala Lys Met Asn Glu His Thr Leu Phe Pro
                485                 490                 495
Leu Thr Asp Ser Trp Trp Thr Gly Gly Asn Ile Pro Gly Lys Ala Thr
            500                 505                 510
Arg Ala Leu Thr Phe Ile Gly Gly Ile Ala Leu Tyr Glu Gln Ile Cys
        515                 520                 525
Gln Glu Lys Val Ala Asn Trp Asp Gly Phe Asp Val Leu His Ala Pro
    530                 535                 540
Cys
545
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<210> 4
<211> 1464
<212> DNA
<213> Exophiala spinifera

<220>
<221> CDS
<222> (1)...(1464)

<221> misc_feature
<222> (0)...(0)
<223> aldehyde dehydrogenase, fully spliced DNA

<400> 4

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atg gtt ctt tcg cct gac gaa tac aag agt gaa ctc ttc atc aac aat   48
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 1               5                  10                  15

gaa ttc gtc tcc tcc aag ggg tcc gag aga tta acg ctc acg aac ccg   96
Glu Phe Val Ser Ser Lys Gly Ser Glu Arg Leu Thr Leu Thr Asn Pro
            20                  25                  30

tgg gac gaa tcc acc gtt gcc act gat gtt cac gtg gcc aac gcg gcc   144
Trp Asp Glu Ser Thr Val Ala Thr Asp Val His Val Ala Asn Ala Ala
        35                  40                  45

gat gtc gac agt gca gta gcc gct tcg gtg cag gcg gtc aaa aag ggc   192
Asp Val Asp Ser Ala Val Ala Ala Ser Val Gln Ala Val Lys Lys Gly
    50                  55                  60

cca tgg aag aag ttc aca ggt gca caa cgc gcg gcg tgc atg ctt aag   240
Pro Trp Lys Lys Phe Thr Gly Ala Gln Arg Ala Ala Cys Met Leu Lys
 65                  70                  75                  80

ttc gcg gac ctc gcc gag aag aac gcc gag aag ctc gct cgt ctg gag   288
Phe Ala Asp Leu Ala Glu Lys Asn Ala Glu Lys Leu Ala Arg Leu Glu
                85                  90                  95

tcg ctg ccc acc ggt aga ccg gtg tcg atg atc act cat ttc gac att   336
Ser Leu Pro Thr Gly Arg Pro Val Ser Met Ile Thr His Phe Asp Ile
            100                 105                 110

cca aac atg gtc tcc gtg ttt cgc tac tat gca ggc tgg gcc gac aag   384
Pro Asn Met Val Ser Val Phe Arg Tyr Tyr Ala Gly Trp Ala Asp Lys
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```
        115                 120                 125

atc gcc gga aag acc ttt ccc gag gac aac ggc aag ccg aat tgg cgt   432
Ile Ala Gly Lys Thr Phe Pro Glu Asp Asn Gly Lys Pro Asn Trp Arg
    130                 135                 140

tac gag ccg atg ggg gtg tgt gct ggt att gcc agc tgg aac gcg act   480
Tyr Glu Pro Met Gly Val Cys Ala Gly Ile Ala Ser Trp Asn Ala Thr
145                 150                 155                 160

ttt ctt tac gtc ggc tgg aag ata gcc ccc gcc ctc gcc gcc ggc tgc   528
Phe Leu Tyr Val Gly Trp Lys Ile Ala Pro Ala Leu Ala Ala Gly Cys
                165                 170                 175

tcc ttc atc ttc aaa gcc tcg gag aaa tcc ccg ctg ggc gtt ctg ggc   576
Ser Phe Ile Phe Lys Ala Ser Glu Lys Ser Pro Leu Gly Val Leu Gly
            180                 185                 190

ctc gct cct ctc ttc gca gaa gcc gga ttc cct cct gga gtc gtg cag   624
Leu Ala Pro Leu Phe Ala Glu Ala Gly Phe Pro Pro Gly Val Val Gln
        195                 200                 205

ttc ctc act gga gca cga gtg acg ggt gaa gca ttg gcg tcg cac atg   672
Phe Leu Thr Gly Ala Arg Val Thr Gly Glu Ala Leu Ala Ser His Met
    210                 215                 220

gac att gcg aag atc agc ttc aca aga tct gtc ggc ggt ggc cgc gcc   720
Asp Ile Ala Lys Ile Ser Phe Thr Arg Ser Val Gly Gly Gly Arg Ala
225                 230                 235                 240

gtc aag caa gca aca ctc aag tcc aac atg aag cgc gtc act cta gaa   768
Val Lys Gln Ala Thr Leu Lys Ser Asn Met Lys Arg Val Thr Leu Glu
                245                 250                 255

ctg ggg gaa aag cca acc atc gtc ttc aac gaa gct cct ctc gaa cgg   816
Leu Gly Glu Lys Pro Thr Ile Val Phe Asn Glu Ala Pro Leu Glu Arg
            260                 265                 270

cag tcg ggg gaa tcg gca aag gat ttc tca aaa ttc ggg caa att tgg   864
Gln Ser Gly Glu Ser Ala Lys Asp Phe Ser Lys Phe Gly Gln Ile Trp
        275                 280                 285

gtc ccc ccc tcc tgt ttg cta gtg caa tgg gga aat tta gcg gag aaa   912
Val Pro Pro Ser Cys Leu Leu Val Gln Trp Gly Asn Leu Ala Glu Lys
    290                 295                 300

ttc cat gga gtc cgt cat ggc tca ttt gga ggc tgt cag aga tgg ctt   960
Phe His Gly Val Arg His Gly Ser Phe Gly Gly Cys Gln Arg Trp Leu
305                 310                 315                 320

ggc cag aac cca ttg gaa ccc aag agg acg cat ggt ccc ttc gtc gac   1008
Gly Gln Asn Pro Leu Glu Pro Lys Arg Thr His Gly Pro Phe Val Asp
                325                 330                 335

aag tcc cag tac gac aga gtc ttg ggt aac att gac gtt ggc aag gat   1056
Lys Ser Gln Tyr Asp Arg Val Leu Gly Asn Ile Asp Val Gly Lys Asp
            340                 345                 350
```

```
acc gcg cag ctc ctc act ggc gtt ggt aga aag ggc gac aag gga ttc   1104
Thr Ala Gln Leu Leu Thr Gly Val Gly Arg Lys Gly Asp Lys Gly Phe
        355                 360                 365

gcg att gaa ccg acg ata ttt gtc aat ccc aaa cca ggc agc aaa att   1152
Ala Ile Glu Pro Thr Ile Phe Val Asn Pro Lys Pro Gly Ser Lys Ile
    370                 375                 380

tgg ttt gag gag atc ttt ggc ccc gtc ttg tcc att aag acg ttc aag   1200
Trp Phe Glu Glu Ile Phe Gly Pro Val Leu Ser Ile Lys Thr Phe Lys
385                 390                 395                 400

acg gaa gaa gag gcc att gag att gcc aat gac acg act tat ggg cta   1248
Thr Glu Glu Glu Ala Ile Glu Ile Ala Asn Asp Thr Thr Tyr Gly Leu
                405                 410                 415

gcc tcg gtc att tat acc aaa tct ctc aac agg ggt ctc cgt gtc tcg   1296
Ala Ser Val Ile Tyr Thr Lys Ser Leu Asn Arg Gly Leu Arg Val Ser
            420                 425                 430

tcg gcg ctc gag acc ggt ggc gtc tcg atc aac ttc ccc ttt atc ccc   1344
Ser Ala Leu Glu Thr Gly Gly Val Ser Ile Asn Phe Pro Phe Ile Pro
        435                 440                 445

gag aca caa act ccg ttt ggc ggc atg aaa caa tcg ggc tca ggc aga   1392
Glu Thr Gln Thr Pro Phe Gly Gly Met Lys Gln Ser Gly Ser Gly Arg
    450                 455                 460

gag cta ggc gaa gaa ggg ctc aag gcg tac ttg gag ccc aag acc att   1440
Glu Leu Gly Glu Glu Gly Leu Lys Ala Tyr Leu Glu Pro Lys Thr Ile
465                 470                 475                 480

aat atc cac gtc aac ata gag tga                                   1464
Asn Ile His Val Asn Ile Glu  *
                485
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<210> 5
<211> 487
<212> PRT
<213> Exophiala spinifera

<400> 5

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            20                  25                  30
Trp Asp Glu Ser Thr Val Ala Thr Asp Val His Val Ala Asn Ala Ala
        35                  40                  45
Asp Val Asp Ser Ala Val Ala Ala Ser Val Gln Ala Val Lys Lys Gly
    50                  55                  60
Pro Trp Lys Lys Phe Thr Gly Ala Gln Arg Ala Ala Cys Met Leu Lys
65                  70                  75                  80
Phe Ala Asp Leu Ala Glu Lys Asn Ala Glu Lys Leu Ala Arg Leu Glu
                85                  90                  95
Ser Leu Pro Thr Gly Arg Pro Val Ser Met Ile Thr His Phe Asp Ile
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100 105 110
Pro Asn Met Val Ser Val Phe Arg Tyr Tyr Ala Gly Trp Ala Asp Lys
115 120 125
Ile Ala Gly Lys Thr Phe Pro Glu Asp Asn Gly Lys Pro Asn Trp Arg
130 135 140
Tyr Glu Pro Met Gly Val Cys Ala Gly Ile Ala Ser Trp Asn Ala Thr
145 150 155 160
Phe Leu Tyr Val Gly Trp Lys Ile Ala Pro Ala Leu Ala Ala Gly Cys
165 170 175
Ser Phe Ile Phe Lys Ala Ser Glu Lys Ser Pro Leu Gly Val Leu Gly
180 185 190
Leu Ala Pro Leu Phe Ala Glu Ala Gly Phe Pro Pro Gly Val Val Gln
195 200 205
Phe Leu Thr Gly Ala Arg Val Thr Gly Glu Ala Leu Ala Ser His Met
210 215 220
Asp Ile Ala Lys Ile Ser Phe Thr Arg Ser Val Gly Gly Gly Arg Ala
225 230 235 240
Val Lys Gln Ala Thr Leu Lys Ser Asn Met Lys Arg Val Thr Leu Glu
245 250 255
Leu Gly Glu Lys Pro Thr Ile Val Phe Asn Glu Ala Pro Leu Glu Arg
260 265 270
Gln Ser Gly Glu Ser Ala Lys Asp Phe Ser Lys Phe Gly Gln Ile Trp
275 280 285
Val Pro Pro Ser Cys Leu Leu Val Gln Trp Gly Asn Leu Ala Glu Lys
290 295 300
Phe His Gly Val Arg His Gly Ser Phe Gly Gly Cys Gln Arg Trp Leu
305 310 315 320
Gly Gln Asn Pro Leu Glu Pro Lys Arg Thr His Gly Pro Phe Val Asp
325 330 335
Lys Ser Gln Tyr Asp Arg Val Leu Gly Asn Ile Asp Val Gly Lys Asp
340 345 350
Thr Ala Gln Leu Leu Thr Gly Val Gly Arg Lys Gly Asp Lys Gly Phe
355 360 365
Ala Ile Glu Pro Thr Ile Phe Val Asn Pro Lys Pro Gly Ser Lys Ile
370 375 380
Trp Phe Glu Glu Ile Phe Gly Pro Val Leu Ser Ile Lys Thr Phe Lys
385 390 395 400
Thr Glu Glu Glu Ala Ile Glu Ile Ala Asn Asp Thr Thr Tyr Gly Leu
405 410 415
Ala Ser Val Ile Tyr Thr Lys Ser Leu Asn Arg Gly Leu Arg Val Ser
420 425 430
Ser Ala Leu Glu Thr Gly Gly Val Ser Ile Asn Phe Pro Phe Ile Pro
435 440 445
Glu Thr Gln Thr Pro Phe Gly Gly Met Lys Gln Ser Gly Ser Gly Arg
450 455 460
Glu Leu Gly Glu Glu Gly Leu Lys Ala Tyr Leu Glu Pro Lys Thr Ile
465 470 475 480
Asn Ile His Val Asn Ile Glu
485

<210> 6
<211> 1764
<212> DNA
<213> Exophiala spinifera

<220>

<221> misc_feature
<222> (0)...(0)
<223> permease, partially spliced cDNA

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gaacacagag acggcggcgg caggtggtgc gtccgagtcc ctgaacgttc ctctggagaa 120
gaaacaattt ggcaccatca ccatcgtgtc cttggccttt gtgatttgca acagttgggc 180
tggtatctca ggcagtctcc agctcgccct actagcgggg gggcccgtca ctctccttta 240
cggcatccta atcagtactc tcgtctacat ctgcatcgct ttctcattag ccgaactgac 300
cagcgtctac ccgactgccg gtggccaata tcattttgcg tcgatcctgg caccaaaatc 360
aatcaatcgg agcatttcat acgtgtgcgg actcgtgtcg ttgctttcat ggatcgctat 420
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aca acg aag aac aca gag acg gcg gcg gca ggt ggt gcg tcc gag tcc 96
Thr Thr Lys Asn Thr Glu Thr Ala Ala Ala Gly Gly Ala Ser Glu Ser
            20   25   30

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ctg aac gtt cct ctg gag aag aaa caa ttt ggc acc atc acc atc gtg   144
Leu Asn Val Pro Leu Glu Lys Lys Gln Phe Gly Thr Ile Thr Ile Val
         35                  40                  45

tcc ttg gcc ttt gtg att tgc aac agt tgg gct ggt atc tca ggc agt   192
Ser Leu Ala Phe Val Ile Cys Asn Ser Trp Ala Gly Ile Ser Gly Ser
     50                  55                  60

ctc cag ctc gcc cta cta gcg ggg ggg ccc gtc act ctc ctt tac ggc   240
Leu Gln Leu Ala Leu Leu Ala Gly Gly Pro Val Thr Leu Leu Tyr Gly
 65                  70                  75                  80

atc cta atc agt act ctc gtc tac atc tgc atc gct ttc tca tta gcc   288
Ile Leu Ile Ser Thr Leu Val Tyr Ile Cys Ile Ala Phe Ser Leu Ala
                 85                  90                  95

gaa ctg acc agc gtc tac ccg act gcc ggt ggc caa tat cat ttt gcg   336
Glu Leu Thr Ser Val Tyr Pro Thr Ala Gly Gly Gln Tyr His Phe Ala
            100                 105                 110

tcg atc ctg gca cca aaa tca atc aat cgg agc att tca tac gtg tgc   384
Ser Ile Leu Ala Pro Lys Ser Ile Asn Arg Ser Ile Ser Tyr Val Cys
        115                 120                 125

gga ctc gtg tcg ttg ctt tca tgg atc gct atc gga agc tca gtg acc   432
Gly Leu Val Ser Leu Leu Ser Trp Ile Ala Ile Gly Ser Ser Val Thr
    130                 135                 140

atg ata cct gct caa cag atc ccg gcg ctg ata gcc gcc tat agt cac   480
Met Ile Pro Ala Gln Gln Ile Pro Ala Leu Ile Ala Ala Tyr Ser His
145                 150                 155                 160

aca tac tcc cag gat tcg tgg cat gtc ttc ctc atc tac gag gga gtc   528
Thr Tyr Ser Gln Asp Ser Trp His Val Phe Leu Ile Tyr Glu Gly Val
                165                 170                 175

gcg ctg gtg gtg ctc ttg ttc aac ttg ttt gcc ctg aaa aga aac cct   576
Ala Leu Val Val Leu Leu Phe Asn Leu Phe Ala Leu Lys Arg Asn Pro
            180                 185                 190

tgg gtt cat gaa atc gga ttc ggc ctc acg atc gct ctc ttc gtg atc   624
Trp Val His Glu Ile Gly Phe Gly Leu Thr Ile Ala Leu Phe Val Ile
        195                 200                 205

tcc ttt atc gcc att cta gcg cgg tcc aac ccc aag gct cca aac tca   672
Ser Phe Ile Ala Ile Leu Ala Arg Ser Asn Pro Lys Ala Pro Asn Ser
    210                 215                 220

cag gta tgg act gct tgg agc aac tat act ggc tgg tcc gac ggc gtc   720
Gln Val Trp Thr Ala Trp Ser Asn Tyr Thr Gly Trp Ser Asp Gly Val
225                 230                 235                 240

tgc ttc atc ctg ggc ctt tcg aca tcc tgc ttc atg ttc att ggc ttg   768
Cys Phe Ile Leu Gly Leu Ser Thr Ser Cys Phe Met Phe Ile Gly Leu
                245                 250                 255
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gac gca gca atg cat ctg gct gaa gaa tgc aca gat gct gct cgt acg   816
Asp Ala Ala Met His Leu Ala Glu Glu Cys Thr Asp Ala Ala Arg Thr
            260                 265                 270

gta ccc aaa gca gtg gtc agt gca atc ata att ggc ttc tgc acc gcc   864
Val Pro Lys Ala Val Val Ser Ala Ile Ile Ile Gly Phe Cys Thr Ala
        275                 280                 285

ttt cca tat aca atc gca gtt ctg tat gga att aca gat ctc gac tct   912
Phe Pro Tyr Thr Ile Ala Val Leu Tyr Gly Ile Thr Asp Leu Asp Ser
    290                 295                 300

att cta agt tcc gcc ggc tat att cca ttc gag aca atg acg cag tcc   960
Ile Leu Ser Ser Ala Gly Tyr Ile Pro Phe Glu Thr Met Thr Gln Ser
305                 310                 315                 320

ctt cgg tcg ctc agt ttt gca acg gtc ctc tca tgt ggc ggt atc gtg   1008
Leu Arg Ser Leu Ser Phe Ala Thr Val Leu Ser Cys Gly Gly Ile Val
                325                 330                 335

atg gcc ttc ttc gcc ctc aac gct gta caa gag act gcg tct cga ctc   1056
Met Ala Phe Phe Ala Leu Asn Ala Val Gln Glu Thr Ala Ser Arg Leu
            340                 345                 350

acc tgg agc ttt gcc cgg gac aat ggg ctg gta ttt tcc act cat ctc   1104
Thr Trp Ser Phe Ala Arg Asp Asn Gly Leu Val Phe Ser Thr His Leu
        355                 360                 365

gaa cgc att cat ccc cgc tgg caa gtt cct gtt tgg tct cta ttc gcg   1152
Glu Arg Ile His Pro Arg Trp Gln Val Pro Val Trp Ser Leu Phe Ala
    370                 375                 380

acc tgg gga att ctg gcc aca tgc gga tgt ata ttt cta ggt tct agc   1200
Thr Trp Gly Ile Leu Ala Thr Cys Gly Cys Ile Phe Leu Gly Ser Ser
385                 390                 395                 400

aca gct ttc aat gcc ttg gtc aat tcc gcc gtt gta ctc cag caa ctc   1248
Thr Ala Phe Asn Ala Leu Val Asn Ser Ala Val Val Leu Gln Gln Leu
                405                 410                 415

tcc ttc ctg atc cca atc gcc cta ctc ctc tac caa aag cga gat cca   1296
Ser Phe Leu Ile Pro Ile Ala Leu Leu Leu Tyr Gln Lys Arg Asp Pro
            420                 425                 430

aag ttc ttg ccg agc act cgt gct ttt gtg tta ccg cgt gga atc ggg   1344
Lys Phe Leu Pro Ser Thr Arg Ala Phe Val Leu Pro Arg Gly Ile Gly
        435                 440                 445

ttt ctg gtc aat gtg cta gcg gtg gtc ttc acg tcc gtc acc act gtg   1392
Phe Leu Val Asn Val Leu Ala Val Val Phe Thr Ser Val Thr Thr Val
    450                 455                 460

ttt ttc agc ttc cca ctg acc gtg cct acg gcc gcg tca acc atg aat   1440
Phe Phe Ser Phe Pro Leu Thr Val Pro Thr Ala Ala Ser Thr Met Asn
465                 470                 475                 480

tac aca agt gcg att ata ggc gtt gca ctt gct ctt ggt gtc ttg aac   1488
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Tyr Thr Ser Ala Ile Ile Gly Val Ala Leu Ala Leu Gly Val Leu Asn
                485                 490                 495

tgg gtc gtg cat gcc agg aag cat tat cag gga ccc cac ttg gag ctt   1536
Trp Val Val His Ala Arg Lys His Tyr Gln Gly Pro His Leu Glu Leu
            500                 505                 510

gac gga cgg gtc gtc gga gca gaa ttt caa gtt ggg cca tga           1578
Asp Gly Arg Val Val Gly Ala Glu Phe Gln Val Gly Pro  *
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<213> Exophiala spinifera

<400> 8

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            20                  25                  30
Leu Asn Val Pro Leu Glu Lys Lys Gln Phe Gly Thr Ile Thr Ile Val
        35                  40                  45
Ser Leu Ala Phe Val Ile Cys Asn Ser Trp Ala Gly Ile Ser Gly Ser
    50                  55                  60
Leu Gln Leu Ala Leu Leu Ala Gly Gly Pro Val Thr Leu Leu Tyr Gly
65                  70                  75                  80
Ile Leu Ile Ser Thr Leu Val Tyr Ile Cys Ile Ala Phe Ser Leu Ala
                85                  90                  95
Glu Leu Thr Ser Val Tyr Pro Thr Ala Gly Gly Gln Tyr His Phe Ala
            100                 105                 110
Ser Ile Leu Ala Pro Lys Ser Ile Asn Arg Ser Ile Ser Tyr Val Cys
        115                 120                 125
Gly Leu Val Ser Leu Leu Ser Trp Ile Ala Ile Gly Ser Ser Val Thr
    130                 135                 140
Met Ile Pro Ala Gln Gln Ile Pro Ala Leu Ile Ala Ala Tyr Ser His
145                 150                 155                 160
Thr Tyr Ser Gln Asp Ser Trp His Val Phe Leu Ile Tyr Glu Gly Val
                165                 170                 175
Ala Leu Val Val Leu Leu Phe Asn Leu Phe Ala Leu Lys Arg Asn Pro
            180                 185                 190
Trp Val His Glu Ile Gly Phe Gly Leu Thr Ile Ala Leu Phe Val Ile
        195                 200                 205
Ser Phe Ile Ala Ile Leu Ala Arg Ser Asn Pro Lys Ala Pro Asn Ser
    210                 215                 220
Gln Val Trp Thr Ala Trp Ser Asn Tyr Thr Gly Trp Ser Asp Gly Val
225                 230                 235                 240
Cys Phe Ile Leu Gly Leu Ser Thr Ser Cys Phe Met Phe Ile Gly Leu
                245                 250                 255
Asp Ala Ala Met His Leu Ala Glu Glu Cys Thr Asp Ala Ala Arg Thr
            260                 265                 270
Val Pro Lys Ala Val Val Ser Ala Ile Ile Ile Gly Phe Cys Thr Ala
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Phe Pro Tyr Thr Ile Ala Val Leu Tyr Gly Ile Thr Asp Leu Asp Ser
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Ile Leu Ser Ser Ala Gly Tyr Ile Pro Phe Glu Thr Met Thr Gln Ser
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Leu Arg Ser Leu Ser Phe Ala Thr Val Leu Ser Cys Gly Gly Ile Val
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Thr Trp Ser Phe Ala Arg Asp Asn Gly Leu Val Phe Ser Thr His Leu
355 360 365
Glu Arg Ile His Pro Arg Trp Gln Val Pro Val Trp Ser Leu Phe Ala
370 375 380
Thr Trp Gly Ile Leu Ala Thr Cys Gly Cys Ile Phe Leu Gly Ser Ser
385 390 395 400
Thr Ala Phe Asn Ala Leu Val Asn Ser Ala Val Val Leu Gln Gln Leu
405 410 415
Ser Phe Leu Ile Pro Ile Ala Leu Leu Leu Tyr Gln Lys Arg Asp Pro
420 425 430
Lys Phe Leu Pro Ser Thr Arg Ala Phe Val Leu Pro Arg Gly Ile Gly
435 440 445
Phe Leu Val Asn Val Leu Ala Val Val Phe Thr Ser Val Thr Thr Val
450 455 460
Phe Phe Ser Phe Pro Leu Thr Val Pro Thr Ala Ala Ser Thr Met Asn
465 470 475 480
Tyr Thr Ser Ala Ile Ile Gly Val Ala Leu Ala Leu Gly Val Leu Asn
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Ser Ser Ser His Pro Pro Pro Glu Lys Glu Thr Glu Gly Ser Ile Ser
20 25 30

gac tat cta cga atc ttc aga tat gcc gac aaa tac gac tgg act ctc 144
Asp Tyr Leu Arg Ile Phe Arg Tyr Ala Asp Lys Tyr Asp Trp Thr Leu
35 40 45

aat gtc atc gcg ctc atc tgc gcc atc gga tcc ggg gct tcc ctt cct 192
Asn Val Ile Ala Leu Ile Cys Ala Ile Gly Ser Gly Ala Ser Leu Pro
50 55 60

ctg atg tcg atc atc ttc ggt agc ttc acc aac aag ttc aac aat tac 240
Leu Met Ser Ile Ile Phe Gly Ser Phe Thr Asn Lys Phe Asn Asn Tyr
65 70 75 80

aat tcg ggc gac ggg agt cct gaa gcg ttc aag gcc gat gtg gat cat 288
Asn Ser Gly Asp Gly Ser Pro Glu Ala Phe Lys Ala Asp Val Asp His
85 90 95

ttc gtc ctg tgg ttc gtc tac ctc ttt att ggg aag ttt gtc ctc acg 336
Phe Val Leu Trp Phe Val Tyr Leu Phe Ile Gly Lys Phe Val Leu Thr
100 105 110

tac gtt tcc acg gct gcc att acc att tca gct ata cga acc act cga 384
Tyr Val Ser Thr Ala Ala Ile Thr Ile Ser Ala Ile Arg Thr Thr Arg
115 120 125

act ctt cga cga gtg ttc ctt gaa tgc acc ttg cgg caa gag gtc tgg 432
Thr Leu Arg Arg Val Phe Leu Glu Cys Thr Leu Arg Gln Glu Val Trp
130 135 140

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His Phe Asp Lys Gln Ser Asn Gly Ala Ile Ala Thr Gln Val Thr Thr
145 150 155 160

aat ggc aac cgt ata caa aca ggt att gcc gag aaa ttg gtc ttt acc 528
Asn Gly Asn Arg Ile Gln Thr Gly Ile Ala Glu Lys Leu Val Phe Thr
165 170 175

gtg cag gca ctt tca atg ttc ttt tct gca ttt gtg gtc gct ttg gcg 576
Val Gln Ala Leu Ser Met Phe Phe Ser Ala Phe Val Val Ala Leu Ala
180 185 190

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tct cag tgg aag cta gct tta atc acc atg tcc gtc atc cct gcc att   624
Ser Gln Trp Lys Leu Ala Leu Ile Thr Met Ser Val Ile Pro Ala Ile
        195                 200                 205

ttc ctg gtc acc ggc atc tgc ata gca att gat gcc gct cag gag gcc   672
Phe Leu Val Thr Gly Ile Cys Ile Ala Ile Asp Ala Ala Gln Glu Ala
    210                 215                 220

agg atc acc agg atc tac tca cgc gcc gct gtc ctc gca gaa gaa gtc   720
Arg Ile Thr Arg Ile Tyr Ser Arg Ala Ala Val Leu Ala Glu Glu Val
225                 230                 235                 240

tta tca tcc atc cgg aca gtc cat gct ttc tac gcc cag aag aaa atg   768
Leu Ser Ser Ile Arg Thr Val His Ala Phe Tyr Ala Gln Lys Lys Met
                245                 250                 255

gtc gaa aaa tat gat gtc ttt ttg cag caa gca cac caa gaa ggg aag   816
Val Glu Lys Tyr Asp Val Phe Leu Gln Gln Ala His Gln Glu Gly Lys
            260                 265                 270

aag aaa tcg cca aat aat ggs gtc ttg ttc tca act gag tac ttt tgc   864
Lys Lys Ser Pro Asn Asn Xaa Val Leu Phe Ser Thr Glu Tyr Phe Cys
        275                 280                 285

att tac gct gct atc gca ctg gcc ttt tgg aaa ggt ttt cgc atg tat   912
Ile Tyr Ala Ala Ile Ala Leu Ala Phe Trp Lys Gly Phe Arg Met Tyr
    290                 295                 300

cag aat ggc gag gtt gcc gac gtt ggc aaa gtc ttt act gtt gtc ctt   960
Gln Asn Gly Glu Val Ala Asp Val Gly Lys Val Phe Thr Val Val Leu
305                 310                 315                 320

tcc gtc acc tta gca gcc acg tcc atc tca atg ctt gcg cct tca ggt   1008
Ser Val Thr Leu Ala Ala Thr Ser Ile Ser Met Leu Ala Pro Ser Gly
                325                 330                 335

tca gtc gtt tac caa cgc cgc atc ttc ggc tcc gaa tta ttc agt atc   1056
Ser Val Val Tyr Gln Arg Arg Ile Phe Gly Ser Glu Leu Phe Ser Ile
            340                 345                 350

att gac aaa ccc acg cag ctc gac cct ctc gac cct tct gga aag cag   1104
Ile Asp Lys Pro Thr Gln Leu Asp Pro Leu Asp Pro Ser Gly Lys Gln
        355                 360                 365

cca gag ggc tgc cta ggt caa att gag atc caa aac ctg gca ttt gcc   1152
Pro Glu Gly Cys Leu Gly Gln Ile Glu Ile Gln Asn Leu Ala Phe Ala
    370                 375                 380

tac ccc tcc cga cca tct gcc caa gta ctt cga gat ttc aac ttg aca   1200
Tyr Pro Ser Arg Pro Ser Ala Gln Val Leu Arg Asp Phe Asn Leu Thr
385                 390                 395                 400

att cca gct ggc aag acg acg gcc ctc gtc ggt gca tca ggt agc ggc   1248
Ile Pro Ala Gly Lys Thr Thr Ala Leu Val Gly Ala Ser Gly Ser Gly
                405                 410                 415

aaa agc aca atg gtc ggc tta ctt gaa cgg tgg tat ctg ccc agt tcg   1296
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Lys Ser Thr Met Val Gly Leu Leu Glu Arg Trp Tyr Leu Pro Ser Ser
            420                 425                 430

ggg agg ata tta ctt gat ggg ttg gaa ctg gga caa tac aat gtg aaa   1344
Gly Arg Ile Leu Leu Asp Gly Leu Glu Leu Gly Gln Tyr Asn Val Lys
        435                 440                 445

tgg ctg aga agc cgc att cgc ctc gtt caa cag gaa cct gtg ttg ttt   1392
Trp Leu Arg Ser Arg Ile Arg Leu Val Gln Gln Glu Pro Val Leu Phe
    450                 455                 460

cgt ggc aca atc ttc cag aac att gcc aac ggt ttc atg gat gag caa   1440
Arg Gly Thr Ile Phe Gln Asn Ile Ala Asn Gly Phe Met Asp Glu Gln
465                 470                 475                 480

cga gat ctg cct cgc gaa aaa caa atg gag ctt gtg caa aaa gct tgc   1488
Arg Asp Leu Pro Arg Glu Lys Gln Met Glu Leu Val Gln Lys Ala Cys
                485                 490                 495

aaa gcc agc aat ggc gac gtg ttc att aat gag ctt ccg aac ggt tat   1536
Lys Ala Ser Asn Gly Asp Val Phe Ile Asn Glu Leu Pro Asn Gly Tyr
            500                 505                 510

gag act gaa gtt ggc gag cga gcc gga gcc ttg agt gga ggt caa cga   1584
Glu Thr Glu Val Gly Glu Arg Ala Gly Ala Leu Ser Gly Gly Gln Arg
        515                 520                 525

caa cga att gca atc gca cga agt atc ata tcg gat ccc aag atc ctg   1632
Gln Arg Ile Ala Ile Ala Arg Ser Ile Ile Ser Asp Pro Lys Ile Leu
    530                 535                 540

tta ctc gat gaa gct acc agc gcc ctt gac ccg aag gcg gag aaa gtg   1680
Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp Pro Lys Ala Glu Lys Val
545                 550                 555                 560

gtc cag gag gcc ttg aac cga gtg tcc aaa gac cgc act act ttg gtc   1728
Val Gln Glu Ala Leu Asn Arg Val Ser Lys Asp Arg Thr Thr Leu Val
                565                 570                 575

att gcc cac aaa cta gcc act gtc aaa agt gct ggc aac atc gca gtc   1776
Ile Ala His Lys Leu Ala Thr Val Lys Ser Ala Gly Asn Ile Ala Val
            580                 585                 590

att tcc cag ggg aaa atc gtc gag caa ggc aca cac cac gaa ttg atc   1824
Ile Ser Gln Gly Lys Ile Val Glu Gln Gly Thr His His Glu Leu Ile
        595                 600                 605

gaa ttc ggc tgt cat tac gcc gca ctg gtg cgt gca cag gac ctc ggg   1872
Glu Phe Gly Cys His Tyr Ala Ala Leu Val Arg Ala Gln Asp Leu Gly
    610                 615                 620

gct gac gaa caa caa gaa cat gag aag acc ctg cac gaa aag gca gca   1920
Ala Asp Glu Gln Gln Glu His Glu Lys Thr Leu His Glu Lys Ala Ala
625                 630                 635                 640

cga gaa gct gct ggt gaa cga ccg gca ctt gag cgc act cac acc act   1968
Arg Glu Ala Ala Gly Glu Arg Pro Ala Leu Glu Arg Thr His Thr Thr
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                645                 650                 655

gcc aca tct caa gct gga gac ctg gag aag cgg aag gtg ccg gtc ggg   2016
Ala Thr Ser Gln Ala Gly Asp Leu Glu Lys Arg Lys Val Pro Val Gly
            660                 665                 670

act ttg ggc tac tcg ctc cta aaa tgc atc cta atc atg ttc tac gaa   2064
Thr Leu Gly Tyr Ser Leu Leu Lys Cys Ile Leu Ile Met Phe Tyr Glu
        675                 680                 685

caa aaa aat ctc tac tgg tgc ttc ttg ttg tca aca ata acg gtt ctg   2112
Gln Lys Asn Leu Tyr Trp Cys Phe Leu Leu Ser Thr Ile Thr Val Leu
    690                 695                 700

ata tgc gcg gcc aca ttt cca gga caa gcc ctt ttg ttt tcg aga ttg   2160
Ile Cys Ala Ala Thr Phe Pro Gly Gln Ala Leu Leu Phe Ser Arg Leu
705                 710                 715                 720

ctc act gtc ttc gag ttg agt ggt cat gcg gca cag gaa cgg gca gac   2208
Leu Thr Val Phe Glu Leu Ser Gly His Ala Ala Gln Glu Arg Ala Asp
                725                 730                 735

ttt tat att ctg atg ttc ttt gtc gtg gct cta gga aat cta gta gga   2256
Phe Tyr Ile Leu Met Phe Phe Val Val Ala Leu Gly Asn Leu Val Gly
            740                 745                 750

tat ttc acg att ggc tgg aca tgc aac gtt att tca caa gtt gtc acc   2304
Tyr Phe Thr Ile Gly Trp Thr Cys Asn Val Ile Ser Gln Val Val Thr
        755                 760                 765

cat cgc tat caa gcc gca atg ttc caa cga gta ctg gat caa gac atc   2352
His Arg Tyr Gln Ala Ala Met Phe Gln Arg Val Leu Asp Gln Asp Ile
    770                 775                 780

gaa ctc ctc gac atc ccg gag caa att tct ggt gct ctc aca tcg caa   2400
Glu Leu Leu Asp Ile Pro Glu Gln Ile Ser Gly Ala Leu Thr Ser Gln
785                 790                 795                 800

ctg tca gct cta ccc acg cag ttg caa gag ttg ata tca gca aat ttt   2448
Leu Ser Ala Leu Pro Thr Gln Leu Gln Glu Leu Ile Ser Ala Asn Phe
                805                 810                 815

ctc att tat atc gtt gtc ggt caa cat cgt ctc gag cag tgc tct acc   2496
Leu Ile Tyr Ile Val Val Gly Gln His Arg Leu Glu Gln Cys Ser Thr
            820                 825                 830

act agc cta tgg atg gaa act ggg cct ggt ggt tgt gtt tgg tgc act   2544
Thr Ser Leu Trp Met Glu Thr Gly Pro Gly Gly Cys Val Trp Cys Thr
        835                 840                 845

tcc acc cct gct ttt ggc tgg cta cct cag aat tcg tct aga gac gaa   2592
Ser Thr Pro Ala Phe Gly Trp Leu Pro Gln Asn Ser Ser Arg Asp Glu
    850                 855                 860

gct aga agc cgg aaa ctc ggc aaa ctt tgc aga aag tgc tgg gct tgc   2640
Ala Arg Ser Arg Lys Leu Gly Lys Leu Cys Arg Lys Cys Trp Ala Cys
865                 870                 875                 880
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aag cga agc agt tac cgc gat ccg gac cgt ctc atc ttt gac tct cga   2688
Lys Arg Ser Ser Tyr Arg Asp Pro Asp Arg Leu Ile Phe Asp Ser Arg
                885                 890                 895

agg cca tgt tct cca aca gta ctc gga cat gtt gag caa ggt ctt gct   2736
Arg Pro Cys Ser Pro Thr Val Leu Gly His Val Glu Gln Gly Leu Ala
            900                 905                 910

aag atc atc caa agc ttt tgg ttt gga cga tgt ttt ggt ttt cac ttg   2784
Lys Ile Ile Gln Ser Phe Trp Phe Gly Arg Cys Phe Gly Phe His Leu
        915                 920                 925

tca cag tcg atg gag ttt ttg gct att gcc ctg gga ttt tgt att gca   2832
Ser Gln Ser Met Glu Phe Leu Ala Ile Ala Leu Gly Phe Cys Ile Ala
    930                 935                 940

gtc gat aat tgg ctt cag gtg agt acg aca caa ctc aat ttt ata tca   2880
Val Asp Asn Trp Leu Gln Val Ser Thr Thr Gln Leu Asn Phe Ile Ser
945                 950                 955                 960

tct tcg tgg gcg ttt tgt ttg ccg gtc caa gca gca gcc cag tat ttg   2928
Ser Ser Trp Ala Phe Cys Leu Pro Val Gln Ala Ala Ala Gln Tyr Leu
                965                 970                 975

gct tac tcc acg agt ttt acc aag gct cgg tcg gct gcg aac tat atc   2976
Ala Tyr Ser Thr Ser Phe Thr Lys Ala Arg Ser Ala Ala Asn Tyr Ile
            980                 985                 990

ctc tgg ctg cgg aca ttg aag ccg acc atc cgc gaa acg gag gag aac   3024
Leu Trp Leu Arg Thr Leu Lys Pro Thr Ile Arg Glu Thr Glu Glu Asn
        995                 1000                1005

aag aaa aaa ggc cca gtg ggt gga tgc cct gtc gac ctc gag gac att   3072
Lys Lys Lys Gly Pro Val Gly Gly Cys Pro Val Asp Leu Glu Asp Ile
    1010                1015                1020

gaa ttc agg tat cgt caa cgt gat tcg gct cga gtt ctc cgc ggg gtt   3120
Glu Phe Arg Tyr Arg Gln Arg Asp Ser Ala Arg Val Leu Arg Gly Val
1025                1030                1035                1040

tcc atg aca atc gag cca gga caa ttt gta gct tat gtg ggc gct tct   3168
Ser Met Thr Ile Glu Pro Gly Gln Phe Val Ala Tyr Val Gly Ala Ser
                1045                1050                1055

ggc tgt ggc aag tca acg ttg atc gct ttg tcg gaa cga ttc tac gac   3216
Gly Cys Gly Lys Ser Thr Leu Ile Ala Leu Ser Glu Arg Phe Tyr Asp
            1060                1065                1070

ccg acc tcg ggc cga att tca ttt gca cac gag aat att gca gaa atg   3264
Pro Thr Ser Gly Arg Ile Ser Phe Ala His Glu Asn Ile Ala Glu Met
        1075                1080                1085

tcg ccg cgc ttg tac cgc ggc cat atg tct ttg gtc caa cag gaa ccc   3312
Ser Pro Arg Leu Tyr Arg Gly His Met Ser Leu Val Gln Gln Glu Pro
    1090                1095                1100
```

```
aca ctt tac caa ggc tcc gtt cgc gag aat gtg acg ttg gcc ctc gaa   3360
Thr Leu Tyr Gln Gly Ser Val Arg Glu Asn Val Thr Leu Ala Leu Glu
1105                1110                1115                1120

gcc gaa tta tca gaa gag ctt tgt caa gga cgc ctt ccc gca agg cca   3408
Ala Glu Leu Ser Glu Glu Leu Cys Gln Gly Arg Leu Pro Ala Arg Pro
                1125                1130                1135

atg ctt tgg att ttg tca tct ctt tac cag aag gct ttg aaa cgc ctt   3456
Met Leu Trp Ile Leu Ser Ser Leu Tyr Gln Lys Ala Leu Lys Arg Leu
            1140                1145                1150

gcg gct caa cga ggg atg cag ttc tcc ggc ggg caa cga cag cgg atc   3504
Ala Ala Gln Arg Gly Met Gln Phe Ser Gly Gly Gln Arg Gln Arg Ile
        1155                1160                1165

gcc atc gca aga gca ttg att cga aat cca aag ctg ttg cta ctt gac   3552
Ala Ile Ala Arg Ala Leu Ile Arg Asn Pro Lys Leu Leu Leu Leu Asp
    1170                1175                1180

gaa gcg acg tca gcc ctc gac acg caa tcg gaa cgt ctg gtt caa gct   3600
Glu Ala Thr Ser Ala Leu Asp Thr Gln Ser Glu Arg Leu Val Gln Ala
1185                1190                1195                1200

gcc ctc gat gag gca tcc acg agc cga acg aca ata gca gtg gcg cac   3648
Ala Leu Asp Glu Ala Ser Thr Ser Arg Thr Thr Ile Ala Val Ala His
                1205                1210                1215

cga ctt tcc act att cgg aat gtt gat gtt att ttt gtg ttt gcc aac   3696
Arg Leu Ser Thr Ile Arg Asn Val Asp Val Ile Phe Val Phe Ala Asn
            1220                1225                1230

ggg aga atc gcc gaa acg ggc act cac gcg gaa cta caa cga ctg aga   3744
Gly Arg Ile Ala Glu Thr Gly Thr His Ala Glu Leu Gln Arg Leu Arg
        1235                1240                1245

gga aga tat tac gag atg tgt ttg gca caa tct tta gac caa gca tga   3792
Gly Arg Tyr Tyr Glu Met Cys Leu Ala Gln Ser Leu Asp Gln Ala  *
    1250                1255                1260
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<210> 11
<211> 1263
<212> PRT
<213> Exophiala spinifera

<220>
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<222> (0)...(0)
<223> Xaa is any amino acid

<400> 11

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Met Ala Asp Glu Ser Glu Lys Pro Arg Pro Asn Gln Asp Gly Ser Glu
 1               5                  10                  15
Ser Ser Ser His Pro Pro Pro Glu Lys Glu Thr Glu Gly Ser Ile Ser
            20                  25                  30
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```
Asp Tyr Leu Arg Ile Phe Arg Tyr Ala Asp Lys Tyr Asp Trp Thr Leu
        35                  40                  45
Asn Val Ile Ala Leu Ile Cys Ala Ile Gly Ser Gly Ala Ser Leu Pro
    50                  55                  60
Leu Met Ser Ile Ile Phe Gly Ser Phe Thr Asn Lys Phe Asn Asn Tyr
65                  70                  75                  80
Asn Ser Gly Asp Gly Ser Pro Glu Ala Phe Lys Ala Asp Val Asp His
                85                  90                  95
Phe Val Leu Trp Phe Val Tyr Leu Phe Ile Gly Lys Phe Val Leu Thr
            100                 105                 110
Tyr Val Ser Thr Ala Ala Ile Thr Ile Ser Ala Ile Arg Thr Thr Arg
        115                 120                 125
Thr Leu Arg Arg Val Phe Leu Glu Cys Thr Leu Arg Gln Glu Val Trp
    130                 135                 140
His Phe Asp Lys Gln Ser Asn Gly Ala Ile Ala Thr Gln Val Thr Thr
145                 150                 155                 160
Asn Gly Asn Arg Ile Gln Thr Gly Ile Ala Glu Lys Leu Val Phe Thr
                165                 170                 175
Val Gln Ala Leu Ser Met Phe Phe Ser Ala Phe Val Val Ala Leu Ala
            180                 185                 190
Ser Gln Trp Lys Leu Ala Leu Ile Thr Met Ser Val Ile Pro Ala Ile
        195                 200                 205
Phe Leu Val Thr Gly Ile Cys Ile Ala Ile Asp Ala Ala Gln Glu Ala
    210                 215                 220
Arg Ile Thr Arg Ile Tyr Ser Arg Ala Ala Val Leu Ala Glu Glu Val
225                 230                 235                 240
Leu Ser Ser Ile Arg Thr Val His Ala Phe Tyr Ala Gln Lys Lys Met
                245                 250                 255
Val Glu Lys Tyr Asp Val Phe Leu Gln Gln Ala His Gln Glu Gly Lys
            260                 265                 270
Lys Lys Ser Pro Asn Asn Xaa Val Leu Phe Ser Thr Glu Tyr Phe Cys
        275                 280                 285
Ile Tyr Ala Ala Ile Ala Leu Ala Phe Trp Lys Gly Phe Arg Met Tyr
    290                 295                 300
Gln Asn Gly Glu Val Ala Asp Val Gly Lys Val Phe Thr Val Val Leu
305                 310                 315                 320
Ser Val Thr Leu Ala Ala Thr Ser Ile Ser Met Leu Ala Pro Ser Gly
                325                 330                 335
Ser Val Val Tyr Gln Arg Arg Ile Phe Gly Ser Glu Leu Phe Ser Ile
            340                 345                 350
Ile Asp Lys Pro Thr Gln Leu Asp Pro Leu Asp Pro Ser Gly Lys Gln
        355                 360                 365
Pro Glu Gly Cys Leu Gly Gln Ile Glu Ile Gln Asn Leu Ala Phe Ala
    370                 375                 380
Tyr Pro Ser Arg Pro Ser Ala Gln Val Leu Arg Asp Phe Asn Leu Thr
385                 390                 395                 400
Ile Pro Ala Gly Lys Thr Thr Ala Leu Val Gly Ala Ser Gly Ser Gly
                405                 410                 415
Lys Ser Thr Met Val Gly Leu Leu Glu Arg Trp Tyr Leu Pro Ser Ser
            420                 425                 430
Gly Arg Ile Leu Leu Asp Gly Leu Glu Leu Gly Gln Tyr Asn Val Lys
        435                 440                 445
Trp Leu Arg Ser Arg Ile Arg Leu Val Gln Gln Glu Pro Val Leu Phe
    450                 455                 460
Arg Gly Thr Ile Phe Gln Asn Ile Ala Asn Gly Phe Met Asp Glu Gln
465                 470                 475                 480
Arg Asp Leu Pro Arg Glu Lys Gln Met Glu Leu Val Gln Lys Ala Cys
```

485 490 495
Lys Ala Ser Asn Gly Asp Val Phe Ile Asn Glu Leu Pro Asn Gly Tyr
500 505 510
Glu Thr Glu Val Gly Glu Arg Ala Gly Ala Leu Ser Gly Gly Gln Arg
515 520 525
Gln Arg Ile Ala Ile Ala Arg Ser Ile Ile Ser Asp Pro Lys Ile Leu
530 535 540
Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp Pro Lys Ala Glu Lys Val
545 550 555 560
Val Gln Glu Ala Leu Asn Arg Val Ser Lys Asp Arg Thr Thr Leu Val
565 570 575
Ile Ala His Lys Leu Ala Thr Val Lys Ser Ala Gly Asn Ile Ala Val
580 585 590
Ile Ser Gln Gly Lys Ile Val Glu Gln Gly Thr His His Glu Leu Ile
595 600 605
Glu Phe Gly Cys His Tyr Ala Ala Leu Val Arg Ala Gln Asp Leu Gly
610 615 620
Ala Asp Glu Gln Gln Glu His Glu Lys Thr Leu His Glu Lys Ala Ala
625 630 635 640
Arg Glu Ala Ala Gly Glu Arg Pro Ala Leu Glu Arg Thr His Thr Thr
645 650 655
Ala Thr Ser Gln Ala Gly Asp Leu Glu Lys Arg Lys Val Pro Val Gly
660 665 670
Thr Leu Gly Tyr Ser Leu Leu Lys Cys Ile Leu Ile Met Phe Tyr Glu
675 680 685
Gln Lys Asn Leu Tyr Trp Cys Phe Leu Leu Ser Thr Ile Thr Val Leu
690 695 700
Ile Cys Ala Ala Thr Phe Pro Gly Gln Ala Leu Leu Phe Ser Arg Leu
705 710 715 720
Leu Thr Val Phe Glu Leu Ser Gly His Ala Ala Gln Glu Arg Ala Asp
725 730 735
Phe Tyr Ile Leu Met Phe Phe Val Val Ala Leu Gly Asn Leu Val Gly
740 745 750
Tyr Phe Thr Ile Gly Trp Thr Cys Asn Val Ile Ser Gln Val Val Thr
755 760 765
His Arg Tyr Gln Ala Ala Met Phe Gln Arg Val Leu Asp Gln Asp Ile
770 775 780
Glu Leu Leu Asp Ile Pro Glu Gln Ile Ser Gly Ala Leu Thr Ser Gln
785 790 795 800
Leu Ser Ala Leu Pro Thr Gln Leu Gln Glu Leu Ile Ser Ala Asn Phe
805 810 815
Leu Ile Tyr Ile Val Val Gly Gln His Arg Leu Glu Gln Cys Ser Thr
820 825 830
Thr Ser Leu Trp Met Glu Thr Gly Pro Gly Gly Cys Val Trp Cys Thr
835 840 845
Ser Thr Pro Ala Phe Gly Trp Leu Pro Gln Asn Ser Ser Arg Asp Glu
850 855 860
Ala Arg Ser Arg Lys Leu Gly Lys Leu Cys Arg Lys Cys Trp Ala Cys
865 870 875 880
Lys Arg Ser Ser Tyr Arg Asp Pro Asp Arg Leu Ile Phe Asp Ser Arg
885 890 895
Arg Pro Cys Ser Pro Thr Val Leu Gly His Val Glu Gln Gly Leu Ala
900 905 910
Lys Ile Ile Gln Ser Phe Trp Phe Gly Arg Cys Phe Gly Phe His Leu
915 920 925
Ser Gln Ser Met Glu Phe Leu Ala Ile Ala Leu Gly Phe Cys Ile Ala
930 935 940

```
Val Asp Asn Trp Leu Gln Val Ser Thr Thr Gln Leu Asn Phe Ile Ser
945                 950                 955                 960
Ser Ser Trp Ala Phe Cys Leu Pro Val Gln Ala Ala Ala Gln Tyr Leu
                965                 970                 975
Ala Tyr Ser Thr Ser Phe Thr Lys Ala Arg Ser Ala Ala Asn Tyr Ile
            980                 985                 990
Leu Trp Leu Arg Thr Leu Lys Pro Thr Ile Arg Glu Thr Glu Glu Asn
        995                 1000                1005
Lys Lys Lys Gly Pro Val Gly Gly Cys Pro Val Asp Leu Glu Asp Ile
    1010                1015                1020
Glu Phe Arg Tyr Arg Gln Arg Asp Ser Ala Arg Val Leu Arg Gly Val
1025                1030                1035                1040
Ser Met Thr Ile Glu Pro Gly Gln Phe Val Ala Tyr Val Gly Ala Ser
                1045                1050                1055
Gly Cys Gly Lys Ser Thr Leu Ile Ala Leu Ser Glu Arg Phe Tyr Asp
            1060                1065                1070
Pro Thr Ser Gly Arg Ile Ser Phe Ala His Glu Asn Ile Ala Glu Met
        1075                1080                1085
Ser Pro Arg Leu Tyr Arg Gly His Met Ser Leu Val Gln Gln Glu Pro
    1090                1095                1100
Thr Leu Tyr Gln Gly Ser Val Arg Glu Asn Val Thr Leu Ala Leu Glu
1105                1110                1115                1120
Ala Glu Leu Ser Glu Glu Leu Cys Gln Gly Arg Leu Pro Ala Arg Pro
                1125                1130                1135
Met Leu Trp Ile Leu Ser Ser Leu Tyr Gln Lys Ala Leu Lys Arg Leu
            1140                1145                1150
Ala Ala Gln Arg Gly Met Gln Phe Ser Gly Gly Gln Arg Gln Arg Ile
        1155                1160                1165
Ala Ile Ala Arg Ala Leu Ile Arg Asn Pro Lys Leu Leu Leu Leu Asp
    1170                1175                1180
Glu Ala Thr Ser Ala Leu Asp Thr Gln Ser Glu Arg Leu Val Gln Ala
1185                1190                1195                1200
Ala Leu Asp Glu Ala Ser Thr Ser Arg Thr Thr Ile Ala Val Ala His
                1205                1210                1215
Arg Leu Ser Thr Ile Arg Asn Val Asp Val Ile Phe Val Phe Ala Asn
            1220                1225                1230
Gly Arg Ile Ala Glu Thr Gly Thr His Ala Glu Leu Gln Arg Leu Arg
        1235                1240                1245
Gly Arg Tyr Tyr Glu Met Cys Leu Ala Gln Ser Leu Asp Gln Ala
    1250                1255                1260
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<210> 12
<211> 1937
<212> DNA
<213> Exophiala spinifera

<220>
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<222> (153)...(1736)

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gcggatccgt ttttttttt ttttttccta agttcgacta cccacttgct agtctcacag 60
tagctccaag ggtataagtt cgactcgaag ctgcatctct ccgtgaaaca tggcaatagt 120
ttttgtagac agatccatca accgagtaca cg atg ccg tca agg tac att ctc 173
                                    Met Pro Ser Arg Tyr Ile Leu
                                     1   5

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tct tgg ctc ctc acc tgc ttt ttg ggc att gct ttt ggc tca cga tgc   221
Ser Trp Leu Leu Thr Cys Phe Leu Gly Ile Ala Phe Gly Ser Arg Cys
          10                  15                  20

ggg tcg tct gct cct act gtc aag att gat gct ggg atg gtg gtc ggc   269
Gly Ser Ser Ala Pro Thr Val Lys Ile Asp Ala Gly Met Val Val Gly
     25                  30                  35

acg act act act gtc ccc ggc acc act gcg acc gtc agc gag ttc ttg   317
Thr Thr Thr Thr Val Pro Gly Thr Thr Ala Thr Val Ser Glu Phe Leu
 40                  45                  50                  55

ggc gtt cct ttt gcc gcc tct ccg aca cga ttt gcg cct cct act cgt   365
Gly Val Pro Phe Ala Ala Ser Pro Thr Arg Phe Ala Pro Pro Thr Arg
                 60                  65                  70

ccc gtg cct tgg tca acg cct ttg caa gcc act gca tat ggt cca gca   413
Pro Val Pro Trp Ser Thr Pro Leu Gln Ala Thr Ala Tyr Gly Pro Ala
            75                  80                  85

tgc cct caa caa ttc aat tac ccc gaa gaa ctc cgt gag att acg atg   461
Cys Pro Gln Gln Phe Asn Tyr Pro Glu Glu Leu Arg Glu Ile Thr Met
         90                  95                 100

gcc tgg ttc aat aca ccg ccc ccg tca gct ggt gaa agt gag gac tgc   509
Ala Trp Phe Asn Thr Pro Pro Pro Ser Ala Gly Glu Ser Glu Asp Cys
    105                 110                 115

ctg aac ctc aac atc tac gtc cca gga act gag aac aca aac aaa gcc   557
Leu Asn Leu Asn Ile Tyr Val Pro Gly Thr Glu Asn Thr Asn Lys Ala
120                 125                 130                 135

gtc atg gtt tgg ata tac ggt gga gcg ctg gaa tat ggt tgg aat tca   605
Val Met Val Trp Ile Tyr Gly Gly Ala Leu Glu Tyr Gly Trp Asn Ser
                140                 145                 150

ttc cac ctt tac gac ggg gct agt ttc gca gcc aat cag gat gtc atc   653
Phe His Leu Tyr Asp Gly Ala Ser Phe Ala Ala Asn Gln Asp Val Ile
            155                 160                 165

gtc gtg acc atc aac tac aga acg aac att ctg ggg ttc cct gct gcc   701
Val Val Thr Ile Asn Tyr Arg Thr Asn Ile Leu Gly Phe Pro Ala Ala
        170                 175                 180

cct cag ctt cca ata aca cag cga aat ctg ggg ttc cta gac caa agg   749
Pro Gln Leu Pro Ile Thr Gln Arg Asn Leu Gly Phe Leu Asp Gln Arg
    185                 190                 195

ttt gct ttg gat tgg gta cag cgg aac atc gca gcc ttt ggc ggt gat   797
Phe Ala Leu Asp Trp Val Gln Arg Asn Ile Ala Ala Phe Gly Gly Asp
200                 205                 210                 215

cct cga aag gtc aca ata ttt ggg cag agt gcg ggg ggc aga agt gtc   845
Pro Arg Lys Val Thr Ile Phe Gly Gln Ser Ala Gly Gly Arg Ser Val
                220                 225                 230
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gac gtc ctc ttg acg tct atg cca cac aac cca ccc ttc cga gca gca   893
Asp Val Leu Leu Thr Ser Met Pro His Asn Pro Pro Phe Arg Ala Ala
            235                 240                 245

atc atg gag tcc ggt gtg gct aac tac aac ttc ccc aag gga gat ttg   941
Ile Met Glu Ser Gly Val Ala Asn Tyr Asn Phe Pro Lys Gly Asp Leu
        250                 255                 260

tcc gaa cct tgg aac acc act gtt caa gct ctc aac tgt acc acc agt   989
Ser Glu Pro Trp Asn Thr Thr Val Gln Ala Leu Asn Cys Thr Thr Ser
    265                 270                 275

atc gac atc ttg agt tgt atg aga aga gtc gat ctc gcc act ctg atg   1037
Ile Asp Ile Leu Ser Cys Met Arg Arg Val Asp Leu Ala Thr Leu Met
280                 285                 290                 295

aac acg atc gag caa ctc gga ctt ggg ttt gag tac acg ttg gac aac   1085
Asn Thr Ile Glu Gln Leu Gly Leu Gly Phe Glu Tyr Thr Leu Asp Asn
                300                 305                 310

gta acg gtt gtg tac cgt tct gaa acg gct cgc acg act ggt gac att   1133
Val Thr Val Val Tyr Arg Ser Glu Thr Ala Arg Thr Thr Gly Asp Ile
            315                 320                 325

gct cgt gta cct gtt ctc gtc ggg acg gtg gcc aac gac gga ctt ctc   1181
Ala Arg Val Pro Val Leu Val Gly Thr Val Ala Asn Asp Gly Leu Leu
        330                 335                 340

ttt gtc ctc ggg gag aat gac acc caa gca tat ctc gag gag gca atc   1229
Phe Val Leu Gly Glu Asn Asp Thr Gln Ala Tyr Leu Glu Glu Ala Ile
    345                 350                 355

ccg aat cag ccc gac ctt tac cag act ctc ctt gga gca tat ccc att   1277
Pro Asn Gln Pro Asp Leu Tyr Gln Thr Leu Leu Gly Ala Tyr Pro Ile
360                 365                 370                 375

gga tcc cca ggg atc gga tcg cct caa gat cag att gcc gcc att gag   1325
Gly Ser Pro Gly Ile Gly Ser Pro Gln Asp Gln Ile Ala Ala Ile Glu
                380                 385                 390

acc gag gta aga ttc cag tgt cct tct gcc atc gtg gct cag gac tcc   1373
Thr Glu Val Arg Phe Gln Cys Pro Ser Ala Ile Val Ala Gln Asp Ser
            395                 400                 405

cgg aat cgg ggt atc cct tct tgg cgc tac tac tac aat gcg acc ttt   1421
Arg Asn Arg Gly Ile Pro Ser Trp Arg Tyr Tyr Tyr Asn Ala Thr Phe
        410                 415                 420

gag aat ctg gag ctt ttc cct ggg tcc gaa gtg tac cac agc tct gaa   1469
Glu Asn Leu Glu Leu Phe Pro Gly Ser Glu Val Tyr His Ser Ser Glu
    425                 430                 435

gtc ggg atg gtg ttt ggc acg tat cct gtc gca agt gcg acc gcc ttg   1517
Val Gly Met Val Phe Gly Thr Tyr Pro Val Ala Ser Ala Thr Ala Leu
440                 445                 450                 455

gag gcc cag acg agc aaa tac atg cag ggt gcc tgg gcg gcc ttt gcc   1565
```

```
Glu Ala Gln Thr Ser Lys Tyr Met Gln Gly Ala Trp Ala Ala Phe Ala
                460                 465                 470

aaa aac ccc atg aat ggg cct ggg tgg aaa caa gtg ccg aat gtc gcg   1613
Lys Asn Pro Met Asn Gly Pro Gly Trp Lys Gln Val Pro Asn Val Ala
            475                 480                 485

gcg ctt ggc tca cca ggc aaa gcc atc cag gtt gac gtc tct cca gcg   1661
Ala Leu Gly Ser Pro Gly Lys Ala Ile Gln Val Asp Val Ser Pro Ala
        490                 495                 500

aca ata gac caa cga tgt gcc ttg tac acg cat tat tat act gag ttg   1709
Thr Ile Asp Gln Arg Cys Ala Leu Tyr Thr His Tyr Tyr Thr Glu Leu
    505                 510                 515

ggc aca atc gcg ccg agg aca ttt tga ggaccagggt attgtaccta         1756
Gly Thr Ile Ala Pro Arg Thr Phe  *
520                 525

cagcgggttc ggaaaaggag gtatctgctg tcaatttgcc gccagccatc attgaagagt 1816
gctgaaattt catgggggaa tatccatcca tgctcacatt agcgcttttg gaagatggac 1876
tgttagcgag tcttgggcgg tttcaggctt ttccccccccc aaaaaaaaaa aaaaaaaaaa 1936
a                                                                 1937

<210> 13
<211> 527
<212> PRT
<213> Exophiala spinifera

<400> 13
Met Pro Ser Arg Tyr Ile Leu Ser Trp Leu Leu Thr Cys Phe Leu Gly
 1               5                  10                  15
Ile Ala Phe Gly Ser Arg Cys Gly Ser Ser Ala Pro Thr Val Lys Ile
            20                  25                  30
Asp Ala Gly Met Val Val Gly Thr Thr Thr Thr Val Pro Gly Thr Thr
        35                  40                  45
Ala Thr Val Ser Glu Phe Leu Gly Val Pro Phe Ala Ala Ser Pro Thr
    50                  55                  60
Arg Phe Ala Pro Pro Thr Arg Pro Val Pro Trp Ser Thr Pro Leu Gln
65                  70                  75                  80
Ala Thr Ala Tyr Gly Pro Ala Cys Pro Gln Gln Phe Asn Tyr Pro Glu
                85                  90                  95
Glu Leu Arg Glu Ile Thr Met Ala Trp Phe Asn Thr Pro Pro Pro Ser
            100                 105                 110
Ala Gly Glu Ser Glu Asp Cys Leu Asn Leu Asn Ile Tyr Val Pro Gly
        115                 120                 125
Thr Glu Asn Thr Asn Lys Ala Val Met Val Trp Ile Tyr Gly Gly Ala
    130                 135                 140
Leu Glu Tyr Gly Trp Asn Ser Phe His Leu Tyr Asp Gly Ala Ser Phe
145                 150                 155                 160
Ala Ala Asn Gln Asp Val Ile Val Val Thr Ile Asn Tyr Arg Thr Asn
                165                 170                 175
Ile Leu Gly Phe Pro Ala Ala Pro Gln Leu Pro Ile Thr Gln Arg Asn
            180                 185                 190
Leu Gly Phe Leu Asp Gln Arg Phe Ala Leu Asp Trp Val Gln Arg Asn
        195                 200                 205
Ile Ala Ala Phe Gly Gly Asp Pro Arg Lys Val Thr Ile Phe Gly Gln
```

```
    210                 215                 220
Ser Ala Gly Gly Arg Ser Val Asp Val Leu Leu Thr Ser Met Pro His
225                 230                 235                 240
Asn Pro Pro Phe Arg Ala Ala Ile Met Glu Ser Gly Val Ala Asn Tyr
                245                 250                 255
Asn Phe Pro Lys Gly Asp Leu Ser Glu Pro Trp Asn Thr Thr Val Gln
            260                 265                 270
Ala Leu Asn Cys Thr Thr Ser Ile Asp Ile Leu Ser Cys Met Arg Arg
        275                 280                 285
Val Asp Leu Ala Thr Leu Met Asn Thr Ile Glu Gln Leu Gly Leu Gly
    290                 295                 300
Phe Glu Tyr Thr Leu Asp Asn Val Thr Val Val Tyr Arg Ser Glu Thr
305                 310                 315                 320
Ala Arg Thr Thr Gly Asp Ile Ala Arg Val Pro Val Leu Val Gly Thr
                325                 330                 335
Val Ala Asn Asp Gly Leu Leu Phe Val Leu Gly Glu Asn Asp Thr Gln
            340                 345                 350
Ala Tyr Leu Glu Glu Ala Ile Pro Asn Gln Pro Asp Leu Tyr Gln Thr
        355                 360                 365
Leu Leu Gly Ala Tyr Pro Ile Gly Ser Pro Gly Ile Gly Ser Pro Gln
    370                 375                 380
Asp Gln Ile Ala Ala Ile Glu Thr Glu Val Arg Phe Gln Cys Pro Ser
385                 390                 395                 400
Ala Ile Val Ala Gln Asp Ser Arg Asn Arg Gly Ile Pro Ser Trp Arg
                405                 410                 415
Tyr Tyr Tyr Asn Ala Thr Phe Glu Asn Leu Glu Leu Phe Pro Gly Ser
            420                 425                 430
Glu Val Tyr His Ser Ser Glu Val Gly Met Val Phe Gly Thr Tyr Pro
        435                 440                 445
Val Ala Ser Ala Thr Ala Leu Glu Ala Gln Thr Ser Lys Tyr Met Gln
    450                 455                 460
Gly Ala Trp Ala Ala Phe Ala Lys Asn Pro Met Asn Gly Pro Gly Trp
465                 470                 475                 480
Lys Gln Val Pro Asn Val Ala Ala Leu Gly Ser Pro Gly Lys Ala Ile
                485                 490                 495
Gln Val Asp Val Ser Pro Ala Thr Ile Asp Gln Arg Cys Ala Leu Tyr
            500                 505                 510
Thr His Tyr Tyr Thr Glu Leu Gly Thr Ile Ala Pro Arg Thr Phe
        515                 520                 525
```

<210> 14
<211> 1800
<212> DNA
<213> Bacterium of ATCC 55552

<220>
<221> CDS
<222> (94)...(1683)

<400> 14
actagtggat cattgcattg gctggcggac tggcgcgccg atagtcgttg cgatggtcgc 60
gagaataagc gtgcgaagtg ggaggatgtg aag atg ggg gcc agg agt atg tgt 114
                                    Met Gly Ala Arg Ser Met Cys
                                     1   5

gcg gga cgg ttc gga cgc ttc tgc att ggc ttg gct tca tcg gtt gcc 162

```
Ala Gly Arg Phe Gly Arg Phe Cys Ile Gly Leu Ala Ser Ser Val Ala
          10                  15                  20

gtg act cta ggg gga gcc tcc gcc gcc ggc gcg gca acc gcg acg gat   210
Val Thr Leu Gly Gly Ala Ser Ala Ala Gly Ala Ala Thr Ala Thr Asp
     25                  30                  35

ttt ccg gtc cgc agg acc gat ctg ggc cag gtt cag gga ctg gcc ggg   258
Phe Pro Val Arg Arg Thr Asp Leu Gly Gln Val Gln Gly Leu Ala Gly
 40                  45                  50                  55

gac gtg atg agc ttt cgc gga ata ccc tat gca gcg ccg ccg gtg ggc   306
Asp Val Met Ser Phe Arg Gly Ile Pro Tyr Ala Ala Pro Pro Val Gly
                 60                  65                  70

ggg ctg cgt tgg aag ccg ccc caa cac gcc cgg ccc tgg gcg ggc gtt   354
Gly Leu Arg Trp Lys Pro Pro Gln His Ala Arg Pro Trp Ala Gly Val
             75                  80                  85

cgc ccc gcc acc caa ttt ggc tcc gac tgc ttc ggc gcg gcc tat ctt   402
Arg Pro Ala Thr Gln Phe Gly Ser Asp Cys Phe Gly Ala Ala Tyr Leu
         90                  95                  100

cgc aaa ggc agc ctc gcc ccc ggc gtg agc gag gac tgt ctt tac ctc   450
Arg Lys Gly Ser Leu Ala Pro Gly Val Ser Glu Asp Cys Leu Tyr Leu
    105                 110                 115

aac gta tgg gcg ccg tca ggc gct aaa ccc ggc cag tac ccc gtc atg   498
Asn Val Trp Ala Pro Ser Gly Ala Lys Pro Gly Gln Tyr Pro Val Met
120                 125                 130                 135

gtc tgg gtc tac ggc ggc ggc ttc gcc ggc ggc acg gcc gcc atg ccc   546
Val Trp Val Tyr Gly Gly Gly Phe Ala Gly Gly Thr Ala Ala Met Pro
                140                 145                 150

tac tac gac ggc gag gcg ctt gcg cga cag ggc gtc gtc gtg gtg acg   594
Tyr Tyr Asp Gly Glu Ala Leu Ala Arg Gln Gly Val Val Val Val Thr
            155                 160                 165

ttt aac tat cgg acg aac atc ctg ggc ttt ttc gcc cat cct ggt ctc   642
Phe Asn Tyr Arg Thr Asn Ile Leu Gly Phe Phe Ala His Pro Gly Leu
        170                 175                 180

tcg cgc gag agc ccc acc gga act tcg ggc aac tac ggc cta ctc gac   690
Ser Arg Glu Ser Pro Thr Gly Thr Ser Gly Asn Tyr Gly Leu Leu Asp
    185                 190                 195

att ctc gcc gct ctt cgg tgg gtg cag agc aac gcc cgc gcc ttc gga   738
Ile Leu Ala Ala Leu Arg Trp Val Gln Ser Asn Ala Arg Ala Phe Gly
200                 205                 210                 215

ggg gac ccc ggc cga gtg acg gtc ttt ggt gaa tcg gcc gga gcg agc   786
Gly Asp Pro Gly Arg Val Thr Val Phe Gly Glu Ser Ala Gly Ala Ser
                220                 225                 230

gcg atc gga ctt ctg ctc acc tcg ccg ctg agc aag ggt ctc ttc cgt   834
Ala Ile Gly Leu Leu Leu Thr Ser Pro Leu Ser Lys Gly Leu Phe Arg
```

```
                235                 240                 245

ggc gct atc ctc gaa agt cca ggg ctg acg cga ccg ctc gcg acg ctc   882
Gly Ala Ile Leu Glu Ser Pro Gly Leu Thr Arg Pro Leu Ala Thr Leu
        250                 255                 260

gcc gac agc gcc gcc tcg ggc gag cgc ctc gac gcc gat ctt tcg cga   930
Ala Asp Ser Ala Ala Ser Gly Glu Arg Leu Asp Ala Asp Leu Ser Arg
    265                 270                 275

ctg cgc tcg acc gac cca gcc acc ctg atg gcg cgc gcc gac gcg gcc   978
Leu Arg Ser Thr Asp Pro Ala Thr Leu Met Ala Arg Ala Asp Ala Ala
280                 285                 290                 295

cgc ccg gca tcg cgg gac ctg cgc agg ccg cgt ccg acc gga ccg atc   1026
Arg Pro Ala Ser Arg Asp Leu Arg Arg Pro Arg Pro Thr Gly Pro Ile
                300                 305                 310

gtc gat ggc cat gtg ctg ccg cag acc gac agc gcg gcg atc gcg gcg   1074
Val Asp Gly His Val Leu Pro Gln Thr Asp Ser Ala Ala Ile Ala Ala
            315                 320                 325

ggg cag ctg gcg ccg gtt cgg gtc ctg atc gga acc aat gcc gac gaa   1122
Gly Gln Leu Ala Pro Val Arg Val Leu Ile Gly Thr Asn Ala Asp Glu
        330                 335                 340

ggc cgc gcc ttc ctc ggg cgc gcg ccg atg gag acg cca gcg gac tac   1170
Gly Arg Ala Phe Leu Gly Arg Ala Pro Met Glu Thr Pro Ala Asp Tyr
    345                 350                 355

caa gcc tat ctg gag gcg cag ttt ggc gac caa gcc gcc gcc gtg gcg   1218
Gln Ala Tyr Leu Glu Ala Gln Phe Gly Asp Gln Ala Ala Ala Val Ala
360                 365                 370                 375

gcg tgc tat ccc ctc gac ggc cgg gcc acg ccc aag gaa atg gtc gcg   1266
Ala Cys Tyr Pro Leu Asp Gly Arg Ala Thr Pro Lys Glu Met Val Ala
                380                 385                 390

cgc atc ttc ggc gac aat cag ttc aat cgg ggg gtc tcg gcc ttc tcg   1314
Arg Ile Phe Gly Asp Asn Gln Phe Asn Arg Gly Val Ser Ala Phe Ser
            395                 400                 405

gaa gcg ctt gtg cgc cag ggc gcg ccc gtg tgg cgt tat cag ttc aac   1362
Glu Ala Leu Val Arg Gln Gly Ala Pro Val Trp Arg Tyr Gln Phe Asn
        410                 415                 420

ggt aat acc gag ggt gga aga gcg ccg gct acc cac gga gcc gaa att   1410
Gly Asn Thr Glu Gly Gly Arg Ala Pro Ala Thr His Gly Ala Glu Ile
    425                 430                 435

ccc tac gtt ttc ggg gtg ttc aag ctc gac gag ttg ggt ctg ttc gat   1458
Pro Tyr Val Phe Gly Val Phe Lys Leu Asp Glu Leu Gly Leu Phe Asp
440                 445                 450                 455

tgg ccg ccc gag ggg ccc acg ccc gcc gac cgt gcg ctg ggc caa ctg   1506
Trp Pro Pro Glu Gly Pro Thr Pro Ala Asp Arg Ala Leu Gly Gln Leu
                460                 465                 470
```

```
atg tcc tcc gcc tgg gtc cgg ttc gcc aag aat ggc gac ccc gcc ggg   1554
Met Ser Ser Ala Trp Val Arg Phe Ala Lys Asn Gly Asp Pro Ala Gly
            475                 480                 485

gac gcc ctt acc tgg cct gcc tat tct acg ggc aag tcg acc atg aca   1602
Asp Ala Leu Thr Trp Pro Ala Tyr Ser Thr Gly Lys Ser Thr Met Thr
        490                 495                 500

ttc ggt ccc gag ggc cgc gcg gcg gtg gtg tcg ccc gga cct tcc atc   1650
Phe Gly Pro Glu Gly Arg Ala Ala Val Val Ser Pro Gly Pro Ser Ile
    505                 510                 515

ccc cct tgc gcg gat ggc gcc aag gcg ggg tga cgccgtcgac gatggcgtga 1703
Pro Pro Cys Ala Asp Gly Ala Lys Ala Gly  *
520                 525

cgacggtcga ggcgatgttc tcgatctgga gtccgcgccg cctcgatttg cgtcgtctcc 1763
ggcgctcaga cgaacgcccc agttccatcc acacagt                          1800
```

<210> 15
<211> 529
<212> PRT
<213> Bacterium of ATCC 55552

<400> 15

```
Met Gly Ala Arg Ser Met Cys Ala Gly Arg Phe Gly Arg Phe Cys Ile
 1               5                  10                  15
Gly Leu Ala Ser Ser Val Ala Val Thr Leu Gly Gly Ala Ser Ala Ala
            20                  25                  30
Gly Ala Ala Thr Ala Thr Asp Phe Pro Val Arg Arg Thr Asp Leu Gly
        35                  40                  45
Gln Val Gln Gly Leu Ala Gly Asp Val Met Ser Phe Arg Gly Ile Pro
    50                  55                  60
Tyr Ala Ala Pro Pro Val Gly Gly Leu Arg Trp Lys Pro Pro Gln His
65                  70                  75                  80
Ala Arg Pro Trp Ala Gly Val Arg Pro Ala Thr Gln Phe Gly Ser Asp
                85                  90                  95
Cys Phe Gly Ala Ala Tyr Leu Arg Lys Gly Ser Leu Ala Pro Gly Val
            100                 105                 110
Ser Glu Asp Cys Leu Tyr Leu Asn Val Trp Ala Pro Ser Gly Ala Lys
        115                 120                 125
Pro Gly Gln Tyr Pro Val Met Val Trp Val Tyr Gly Gly Gly Phe Ala
    130                 135                 140
Gly Gly Thr Ala Ala Met Pro Tyr Tyr Asp Gly Glu Ala Leu Ala Arg
145                 150                 155                 160
Gln Gly Val Val Val Val Thr Phe Asn Tyr Arg Thr Asn Ile Leu Gly
                165                 170                 175
Phe Phe Ala His Pro Gly Leu Ser Arg Glu Ser Pro Thr Gly Thr Ser
            180                 185                 190
Gly Asn Tyr Gly Leu Leu Asp Ile Leu Ala Ala Leu Arg Trp Val Gln
        195                 200                 205
Ser Asn Ala Arg Ala Phe Gly Gly Asp Pro Gly Arg Val Thr Val Phe
    210                 215                 220
Gly Glu Ser Ala Gly Ala Ser Ala Ile Gly Leu Leu Leu Thr Ser Pro
225                 230                 235                 240
Leu Ser Lys Gly Leu Phe Arg Gly Ala Ile Leu Glu Ser Pro Gly Leu
```

```
                245                 250                 255
Thr Arg Pro Leu Ala Thr Leu Ala Asp Ser Ala Ala Ser Gly Glu Arg
            260                 265                 270
Leu Asp Ala Asp Leu Ser Arg Leu Arg Ser Thr Asp Pro Ala Thr Leu
        275                 280                 285
Met Ala Arg Ala Asp Ala Ala Arg Pro Ala Ser Arg Asp Leu Arg Arg
    290                 295                 300
Pro Arg Pro Thr Gly Pro Ile Val Asp Gly His Val Leu Pro Gln Thr
305                 310                 315                 320
Asp Ser Ala Ala Ile Ala Ala Gly Gln Leu Ala Pro Val Arg Val Leu
                325                 330                 335
Ile Gly Thr Asn Ala Asp Glu Gly Arg Ala Phe Leu Gly Arg Ala Pro
            340                 345                 350
Met Glu Thr Pro Ala Asp Tyr Gln Ala Tyr Leu Glu Ala Gln Phe Gly
        355                 360                 365
Asp Gln Ala Ala Ala Val Ala Ala Cys Tyr Pro Leu Asp Gly Arg Ala
    370                 375                 380
Thr Pro Lys Glu Met Val Ala Arg Ile Phe Gly Asp Asn Gln Phe Asn
385                 390                 395                 400
Arg Gly Val Ser Ala Phe Ser Glu Ala Leu Val Arg Gln Gly Ala Pro
                405                 410                 415
Val Trp Arg Tyr Gln Phe Asn Gly Asn Thr Glu Gly Gly Arg Ala Pro
            420                 425                 430
Ala Thr His Gly Ala Glu Ile Pro Tyr Val Phe Gly Val Phe Lys Leu
        435                 440                 445
Asp Glu Leu Gly Leu Phe Asp Trp Pro Pro Glu Gly Pro Thr Pro Ala
    450                 455                 460
Asp Arg Ala Leu Gly Gln Leu Met Ser Ser Ala Trp Val Arg Phe Ala
465                 470                 475                 480
Lys Asn Gly Asp Pro Ala Gly Asp Ala Leu Thr Trp Pro Ala Tyr Ser
                485                 490                 495
Thr Gly Lys Ser Thr Met Thr Phe Gly Pro Glu Gly Arg Ala Ala Val
            500                 505                 510
Val Ser Pro Gly Pro Ser Ile Pro Pro Cys Ala Asp Gly Ala Lys Ala
        515                 520                 525
Gly
```

<210> 16
<211> 1389
<212> DNA
<213> Exophiala spinifera

<220>
<221> CDS
<222> (1)...(1389)

<221> misc_feature
<222> (0)...(0)
<223> truncated APAO

<400> 16
```
gac aac gtt gcg gac gtg gta gtg gtg ggc gct ggc ttg agc ggt ttg   48
Asp Asn Val Ala Asp Val Val Val Val Gly Ala Gly Leu Ser Gly Leu
 1               5                  10                  15
```

```
gag acg gca cgc aaa gtc cag gcc gcc ggt ctg tcc tgc ctc gtt ctt   96
Glu Thr Ala Arg Lys Val Gln Ala Ala Gly Leu Ser Cys Leu Val Leu
             20                  25                  30

gag gcg atg gat cgt gta ggg gga aag act ctg agc gta caa tcg ggt   144
Glu Ala Met Asp Arg Val Gly Gly Lys Thr Leu Ser Val Gln Ser Gly
         35                  40                  45

ccc ggc agg acg act atc aac gac ctc ggc gct gcg tgg atc aat gac   192
Pro Gly Arg Thr Thr Ile Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp
     50                  55                  60

agc aac caa agc gaa gta tcc aga ttg ttt gaa aga ttt cat ttg gag   240
Ser Asn Gln Ser Glu Val Ser Arg Leu Phe Glu Arg Phe His Leu Glu
 65                  70                  75                  80

ggc gag ctc cag agg acg act gga aat tca atc cat caa gca caa gac   288
Gly Glu Leu Gln Arg Thr Thr Gly Asn Ser Ile His Gln Ala Gln Asp
                 85                  90                  95

ggt aca acc act aca gct cct tat ggt gac tcc ttg ctg agc gag gag   336
Gly Thr Thr Thr Thr Ala Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu
            100                 105                 110

gtt gca agt gca ctt gcg gaa ctc ctc ccc gta tgg tct cag ctg atc   384
Val Ala Ser Ala Leu Ala Glu Leu Leu Pro Val Trp Ser Gln Leu Ile
        115                 120                 125

gaa gag cat agc ctt caa gac ctc aag gcg agc cct cag gcg aag cgg   432
Glu Glu His Ser Leu Gln Asp Leu Lys Ala Ser Pro Gln Ala Lys Arg
    130                 135                 140

ctc gac agt gtg agc ttc gcg cac tac tgt gag aag gaa cta aac ttg   480
Leu Asp Ser Val Ser Phe Ala His Tyr Cys Glu Lys Glu Leu Asn Leu
145                 150                 155                 160

cct gct gtt ctc ggc gta gca aac cag atc aca cgc gct ctg ctc ggt   528
Pro Ala Val Leu Gly Val Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly
                165                 170                 175

gtg gaa gcc cac gag atc agc atg ctt ttt ctc acc gac tac atc aag   576
Val Glu Ala His Glu Ile Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys
            180                 185                 190

agt gcc acc ggt ctc agt aat att ttc tcg gac aag aaa gac ggc ggg   624
Ser Ala Thr Gly Leu Ser Asn Ile Phe Ser Asp Lys Lys Asp Gly Gly
        195                 200                 205

cag tat atg cga tgc aaa aca ggt atg cag tcg att tgc cat gcc atg   672
Gln Tyr Met Arg Cys Lys Thr Gly Met Gln Ser Ile Cys His Ala Met
    210                 215                 220

tca aag gaa ctt gtt cca ggc tca gtg cac ctc aac acc ccc gtc gct   720
Ser Lys Glu Leu Val Pro Gly Ser Val His Leu Asn Thr Pro Val Ala
225                 230                 235                 240

gaa att gag cag tcg gca tcc ggc tgt aca gta cga tcg gcc tcg ggc   768
```

```
Glu Ile Glu Gln Ser Ala Ser Gly Cys Thr Val Arg Ser Ala Ser Gly
                245                 250                 255

gcc gtg ttc cga agc aaa aag gtg gtg gtt tcg tta ccg aca acc ttg   816
Ala Val Phe Arg Ser Lys Lys Val Val Val Ser Leu Pro Thr Thr Leu
            260                 265                 270

tat ccc acc ttg aca ttt tca cca cct ctt ccc gcc gag aag caa gca   864
Tyr Pro Thr Leu Thr Phe Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala
        275                 280                 285

ttg gcg gaa aat tct atc ctg ggc tac tat agc aag ata gtc ttc gta   912
Leu Ala Glu Asn Ser Ile Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val
    290                 295                 300

tgg gac aag ccg tgg tgg cgc gaa caa ggc ttc tcg ggc gtc ctc caa   960
Trp Asp Lys Pro Trp Trp Arg Glu Gln Gly Phe Ser Gly Val Leu Gln
305                 310                 315                 320

tcg agc tgt gac ccc atc tca ttt gcc aga gat acc agc atc gac gtc   1008
Ser Ser Cys Asp Pro Ile Ser Phe Ala Arg Asp Thr Ser Ile Asp Val
                325                 330                 335

gat cga caa tgg tcc att acc tgt ttc atg gtc gga gac ccg gga cgg   1056
Asp Arg Gln Trp Ser Ile Thr Cys Phe Met Val Gly Asp Pro Gly Arg
            340                 345                 350

aag tgg tcc caa cag tcc aag cag gta cga caa aag tct gtc tgg gac   1104
Lys Trp Ser Gln Gln Ser Lys Gln Val Arg Gln Lys Ser Val Trp Asp
        355                 360                 365

caa ctc cgc gca gcc tac gag aac gcc ggg gcc caa gtc cca gag ccg   1152
Gln Leu Arg Ala Ala Tyr Glu Asn Ala Gly Ala Gln Val Pro Glu Pro
    370                 375                 380

gcc aac gtg ctc gaa atc gag tgg tcg aag cag cag tat ttc caa gga   1200
Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly
385                 390                 395                 400

gct ccg agc gcc gtc tat ggg ctg aac gat ctc atc aca ctg ggt tcg   1248
Ala Pro Ser Ala Val Tyr Gly Leu Asn Asp Leu Ile Thr Leu Gly Ser
                405                 410                 415

gcg ctc aga acg ccg ttc aag agt gtt cat ttc gtt gga acg gag acg   1296
Ala Leu Arg Thr Pro Phe Lys Ser Val His Phe Val Gly Thr Glu Thr
            420                 425                 430

tct tta gtt tgg aaa ggg tat atg gaa ggg gcc ata cga tcg ggt caa   1344
Ser Leu Val Trp Lys Gly Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln
        435                 440                 445

cga ggt gct gca gaa gtt gtg gct agc ctg gtg cca gca gca tag       1389
Arg Gly Ala Ala Glu Val Val Ala Ser Leu Val Pro Ala Ala  *
    450                 455                 460
```

<210> 17
<211> 462
<212> PRT
<213> Exophiala spinifera

<400> 17
Asp Asn Val Ala Asp Val Val Val Val Gly Ala Gly Leu Ser Gly Leu
 1   5   10   15
Glu Thr Ala Arg Lys Val Gln Ala Ala Gly Leu Ser Cys Leu Val Leu
            20   25   30
Glu Ala Met Asp Arg Val Gly Gly Lys Thr Leu Ser Val Gln Ser Gly
        35   40   45
Pro Gly Arg Thr Thr Ile Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp
    50   55   60
Ser Asn Gln Ser Glu Val Ser Arg Leu Phe Glu Arg Phe His Leu Glu
65   70   75   80
Gly Glu Leu Gln Arg Thr Thr Gly Asn Ser Ile His Gln Ala Gln Asp
                85   90   95
Gly Thr Thr Thr Thr Ala Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu
            100   105   110
Val Ala Ser Ala Leu Ala Glu Leu Leu Pro Val Trp Ser Gln Leu Ile
        115   120   125
Glu Glu His Ser Leu Gln Asp Leu Lys Ala Ser Pro Gln Ala Lys Arg
    130   135   140
Leu Asp Ser Val Ser Phe Ala His Tyr Cys Glu Lys Glu Leu Asn Leu
145   150   155   160
Pro Ala Val Leu Gly Val Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly
                165   170   175
Val Glu Ala His Glu Ile Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys
            180   185   190
Ser Ala Thr Gly Leu Ser Asn Ile Phe Ser Asp Lys Lys Asp Gly Gly
        195   200   205
Gln Tyr Met Arg Cys Lys Thr Gly Met Gln Ser Ile Cys His Ala Met
    210   215   220
Ser Lys Glu Leu Val Pro Gly Ser Val His Leu Asn Thr Pro Val Ala
225   230   235   240
Glu Ile Glu Gln Ser Ala Ser Gly Cys Thr Val Arg Ser Ala Ser Gly
                245   250   255
Ala Val Phe Arg Ser Lys Lys Val Val Val Ser Leu Pro Thr Thr Leu
            260   265   270
Tyr Pro Thr Leu Thr Phe Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala
        275   280   285
Leu Ala Glu Asn Ser Ile Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val
    290   295   300
Trp Asp Lys Pro Trp Trp Arg Glu Gln Gly Phe Ser Gly Val Leu Gln
305   310   315   320
Ser Ser Cys Asp Pro Ile Ser Phe Ala Arg Asp Thr Ser Ile Asp Val
                325   330   335
Asp Arg Gln Trp Ser Ile Thr Cys Phe Met Val Gly Asp Pro Gly Arg
            340   345   350
Lys Trp Ser Gln Gln Ser Lys Gln Val Arg Gln Lys Ser Val Trp Asp
        355   360   365
Gln Leu Arg Ala Ala Tyr Glu Asn Ala Gly Ala Gln Val Pro Glu Pro
    370   375   380
Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly
385   390   395   400
Ala Pro Ser Ala Val Tyr Gly Leu Asn Asp Leu Ile Thr Leu Gly Ser

```
                405                 410                 415
Ala Leu Arg Thr Pro Phe Lys Ser Val His Phe Val Gly Thr Glu Thr
            420                 425                 430
Ser Leu Val Trp Lys Gly Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln
        435                 440                 445
Arg Gly Ala Ala Glu Val Val Ala Ser Leu Val Pro Ala Ala
    450                 455                 460
```

<210> 18
<211> 1392
<212> DNA
<213> Exophiala spinifera

<220>
<221> CDS
<222> (1)...(1392)

<221> misc_feature
<222> (0)...(0)
<223> truncated APAO with additional Lysine

<400> 18

```
aaa gac aac gtt gcg gac gtg gta gtg gtg ggc gct ggc ttg agc ggt   48
Lys Asp Asn Val Ala Asp Val Val Val Val Gly Ala Gly Leu Ser Gly
 1               5                  10                  15

ttg gag acg gca cgc aaa gtc cag gcc gcc ggt ctg tcc tgc ctc gtt   96
Leu Glu Thr Ala Arg Lys Val Gln Ala Ala Gly Leu Ser Cys Leu Val
            20                  25                  30

ctt gag gcg atg gat cgt gta ggg gga aag act ctg agc gta caa tcg   144
Leu Glu Ala Met Asp Arg Val Gly Gly Lys Thr Leu Ser Val Gln Ser
        35                  40                  45

ggt ccc ggc agg acg act atc aac gac ctc ggc gct gcg tgg atc aat   192
Gly Pro Gly Arg Thr Thr Ile Asn Asp Leu Gly Ala Ala Trp Ile Asn
    50                  55                  60

gac agc aac caa agc gaa gta tcc aga ttg ttt gaa aga ttt cat ttg   240
Asp Ser Asn Gln Ser Glu Val Ser Arg Leu Phe Glu Arg Phe His Leu
65                  70                  75                  80

gag ggc gag ctc cag agg acg act gga aat tca atc cat caa gca caa   288
Glu Gly Glu Leu Gln Arg Thr Thr Gly Asn Ser Ile His Gln Ala Gln
                85                  90                  95

gac ggt aca acc act aca gct cct tat ggt gac tcc ttg ctg agc gag   336
Asp Gly Thr Thr Thr Thr Ala Pro Tyr Gly Asp Ser Leu Leu Ser Glu
            100                 105                 110

gag gtt gca agt gca ctt gcg gaa ctc ctc ccc gta tgg tct cag ctg   384
Glu Val Ala Ser Ala Leu Ala Glu Leu Leu Pro Val Trp Ser Gln Leu
        115                 120                 125

atc gaa gag cat agc ctt caa gac ctc aag gcg agc cct cag gcg aag   432
Ile Glu Glu His Ser Leu Gln Asp Leu Lys Ala Ser Pro Gln Ala Lys
```

```
    130                 135                 140

cgg ctc gac agt gtg agc ttc gcg cac tac tgt gag aag gaa cta aac   480
Arg Leu Asp Ser Val Ser Phe Ala His Tyr Cys Glu Lys Glu Leu Asn
145                 150                 155                 160

ttg cct gct gtt ctc ggc gta gca aac cag atc aca cgc gct ctg ctc   528
Leu Pro Ala Val Leu Gly Val Ala Asn Gln Ile Thr Arg Ala Leu Leu
                165                 170                 175

ggt gtg gaa gcc cac gag atc agc atg ctt ttt ctc acc gac tac atc   576
Gly Val Glu Ala His Glu Ile Ser Met Leu Phe Leu Thr Asp Tyr Ile
            180                 185                 190

aag agt gcc acc ggt ctc agt aat att ttc tcg gac aag aaa gac ggc   624
Lys Ser Ala Thr Gly Leu Ser Asn Ile Phe Ser Asp Lys Lys Asp Gly
        195                 200                 205

ggg cag tat atg cga tgc aaa aca ggt atg cag tcg att tgc cat gcc   672
Gly Gln Tyr Met Arg Cys Lys Thr Gly Met Gln Ser Ile Cys His Ala
    210                 215                 220

atg tca aag gaa ctt gtt cca ggc tca gtg cac ctc aac acc ccc gtc   720
Met Ser Lys Glu Leu Val Pro Gly Ser Val His Leu Asn Thr Pro Val
225                 230                 235                 240

gct gaa att gag cag tcg gca tcc ggc tgt aca gta cga tcg gcc tcg   768
Ala Glu Ile Glu Gln Ser Ala Ser Gly Cys Thr Val Arg Ser Ala Ser
                245                 250                 255

ggc gcc gtg ttc cga agc aaa aag gtg gtg gtt tcg tta ccg aca acc   816
Gly Ala Val Phe Arg Ser Lys Lys Val Val Val Ser Leu Pro Thr Thr
            260                 265                 270

ttg tat ccc acc ttg aca ttt tca cca cct ctt ccc gcc gag aag caa   864
Leu Tyr Pro Thr Leu Thr Phe Ser Pro Pro Leu Pro Ala Glu Lys Gln
        275                 280                 285

gca ttg gcg gaa aat tct atc ctg ggc tac tat agc aag ata gtc ttc   912
Ala Leu Ala Glu Asn Ser Ile Leu Gly Tyr Tyr Ser Lys Ile Val Phe
    290                 295                 300

gta tgg gac aag ccg tgg tgg cgc gaa caa ggc ttc tcg ggc gtc ctc   960
Val Trp Asp Lys Pro Trp Trp Arg Glu Gln Gly Phe Ser Gly Val Leu
305                 310                 315                 320

caa tcg agc tgt gac ccc atc tca ttt gcc aga gat acc agc atc gac   1008
Gln Ser Ser Cys Asp Pro Ile Ser Phe Ala Arg Asp Thr Ser Ile Asp
                325                 330                 335

gtc gat cga caa tgg tcc att acc tgt ttc atg gtc gga gac ccg gga   1056
Val Asp Arg Gln Trp Ser Ile Thr Cys Phe Met Val Gly Asp Pro Gly
            340                 345                 350

cgg aag tgg tcc caa cag tcc aag cag gta cga caa aag tct gtc tgg   1104
Arg Lys Trp Ser Gln Gln Ser Lys Gln Val Arg Gln Lys Ser Val Trp
        355                 360                 365
```

```
gac caa ctc cgc gca gcc tac gag aac gcc ggg gcc caa gtc cca gag   1152
Asp Gln Leu Arg Ala Ala Tyr Glu Asn Ala Gly Ala Gln Val Pro Glu
    370                 375                 380

ccg gcc aac gtg ctc gaa atc gag tgg tcg aag cag cag tat ttc caa   1200
Pro Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe Gln
385                 390                 395                 400

gga gct ccg agc gcc gtc tat ggg ctg aac gat ctc atc aca ctg ggt   1248
Gly Ala Pro Ser Ala Val Tyr Gly Leu Asn Asp Leu Ile Thr Leu Gly
                405                 410                 415

tcg gcg ctc aga acg ccg ttc aag agt gtt cat ttc gtt gga acg gag   1296
Ser Ala Leu Arg Thr Pro Phe Lys Ser Val His Phe Val Gly Thr Glu
            420                 425                 430

acg tct tta gtt tgg aaa ggg tat atg gaa ggg gcc ata cga tcg ggt   1344
Thr Ser Leu Val Trp Lys Gly Tyr Met Glu Gly Ala Ile Arg Ser Gly
        435                 440                 445

caa cga ggt gct gca gaa gtt gtg gct agc ctg gtg cca gca gca tag   1392
Gln Arg Gly Ala Ala Glu Val Val Ala Ser Leu Val Pro Ala Ala  *
    450                 455                 460
```

<210> 19
<211> 463
<212> PRT
<213> Exophiala spinifera

<400> 19

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Lys Asp Asn Val Ala Asp Val Val Val Val Gly Ala Gly Leu Ser Gly
 1               5                  10                  15
Leu Glu Thr Ala Arg Lys Val Gln Ala Ala Gly Leu Ser Cys Leu Val
            20                  25                  30
Leu Glu Ala Met Asp Arg Val Gly Gly Lys Thr Leu Ser Val Gln Ser
        35                  40                  45
Gly Pro Gly Arg Thr Thr Ile Asn Asp Leu Gly Ala Ala Trp Ile Asn
    50                  55                  60
Asp Ser Asn Gln Ser Glu Val Ser Arg Leu Phe Glu Arg Phe His Leu
65                  70                  75                  80
Glu Gly Glu Leu Gln Arg Thr Thr Gly Asn Ser Ile His Gln Ala Gln
                85                  90                  95
Asp Gly Thr Thr Thr Thr Ala Pro Tyr Gly Asp Ser Leu Leu Ser Glu
            100                 105                 110
Glu Val Ala Ser Ala Leu Ala Glu Leu Leu Pro Val Trp Ser Gln Leu
        115                 120                 125
Ile Glu Glu His Ser Leu Gln Asp Leu Lys Ala Ser Pro Gln Ala Lys
    130                 135                 140
Arg Leu Asp Ser Val Ser Phe Ala His Tyr Cys Glu Lys Glu Leu Asn
145                 150                 155                 160
Leu Pro Ala Val Leu Gly Val Ala Asn Gln Ile Thr Arg Ala Leu Leu
                165                 170                 175
Gly Val Glu Ala His Glu Ile Ser Met Leu Phe Leu Thr Asp Tyr Ile
            180                 185                 190
```

```
Lys Ser Ala Thr Gly Leu Ser Asn Ile Phe Ser Asp Lys Lys Asp Gly
        195                 200                 205
Gly Gln Tyr Met Arg Cys Lys Thr Gly Met Gln Ser Ile Cys His Ala
    210                 215                 220
Met Ser Lys Glu Leu Val Pro Gly Ser Val His Leu Asn Thr Pro Val
225                 230                 235                 240
Ala Glu Ile Glu Gln Ser Ala Ser Gly Cys Thr Val Arg Ser Ala Ser
                245                 250                 255
Gly Ala Val Phe Arg Ser Lys Lys Val Val Ser Leu Pro Thr Thr
            260                 265                 270
Leu Tyr Pro Thr Leu Thr Phe Ser Pro Pro Leu Pro Ala Glu Lys Gln
        275                 280                 285
Ala Leu Ala Glu Asn Ser Ile Leu Gly Tyr Tyr Ser Lys Ile Val Phe
    290                 295                 300
Val Trp Asp Lys Pro Trp Trp Arg Glu Gln Gly Phe Ser Gly Val Leu
305                 310                 315                 320
Gln Ser Ser Cys Asp Pro Ile Ser Phe Ala Arg Asp Thr Ser Ile Asp
                325                 330                 335
Val Asp Arg Gln Trp Ser Ile Thr Cys Phe Met Val Gly Asp Pro Gly
            340                 345                 350
Arg Lys Trp Ser Gln Gln Ser Lys Gln Val Arg Gln Lys Ser Val Trp
        355                 360                 365
Asp Gln Leu Arg Ala Ala Tyr Glu Asn Ala Gly Ala Gln Val Pro Glu
    370                 375                 380
Pro Ala Asn Val Leu Glu Ile Glu Trp Ser Lys Gln Gln Tyr Phe Gln
385                 390                 395                 400
Gly Ala Pro Ser Ala Val Tyr Gly Leu Asn Asp Leu Ile Thr Leu Gly
                405                 410                 415
Ser Ala Leu Arg Thr Pro Phe Lys Ser Val His Phe Val Gly Thr Glu
            420                 425                 430
Thr Ser Leu Val Trp Lys Gly Tyr Met Glu Gly Ala Ile Arg Ser Gly
        435                 440                 445
Gln Arg Gly Ala Ala Glu Val Val Ala Ser Leu Val Pro Ala Ala
    450                 455                 460
```

<210> 20
<211> 1803
<212> DNA
<213> Exophiala spinifera

<220>
<221> CDS
<222> (1)...(1800)

<221> misc_feature
<222> (0)...(0)
<223> full-length APAO

<400> 20

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atg gca ctt gca ccg agc tac atc aat ccc cca aac gtc gcc tcc cca   48
Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Val Ala Ser Pro
 1               5                  10                  15

gca ggg tat tct cac gtc ggc gta ggc cca gac gga ggg agg tat gtg   96
Ala Gly Tyr Ser His Val Gly Val Gly Pro Asp Gly Gly Arg Tyr Val
            20                  25                  30
```

```
aca ata gct gga cag att gga caa gac gct tcg ggc gtg aca gac cct   144
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Ser Gly Val Thr Asp Pro
         35                  40                  45

gcc tac gag aaa cag gtt gcc caa gca ttc gcc aat ctg cga gct tgc   192
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
     50                  55                  60

ctt gct gca gtt gga gcc act tca aac gac gtc acc aag ctc aat tac   240
Leu Ala Ala Val Gly Ala Thr Ser Asn Asp Val Thr Lys Leu Asn Tyr
 65                  70                  75                  80

tac atc gtc gac tac gcc ccg agc aaa ctc acc gca att gga gat ggg   288
Tyr Ile Val Asp Tyr Ala Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                 85                  90                  95

ctg aag gct acc ttt gcc ctt gac agg ctc cct cct tgc acg ctg gtg   336
Leu Lys Ala Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100                 105                 110

cca gtg tcg gcc ttg tct tca cct gaa tac ctc ttt gag gtt gat gcc   384
Pro Val Ser Ala Leu Ser Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
        115                 120                 125

acg gcg ctg gtg ccg gga cac acg acc cca gac aac gtt gcg gac gtg   432
Thr Ala Leu Val Pro Gly His Thr Thr Pro Asp Asn Val Ala Asp Val
    130                 135                 140

gta gtg gtg ggc gct ggc ttg agc ggt ttg gag acg gca cgc aaa gtc   480
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145                 150                 155                 160

cag gcc gcc ggt ctg tcc tgc ctc gtt ctt gag gcg atg gat cgt gta   528
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
                165                 170                 175

ggg gga aag act ctg agc gta caa tcg ggt ccc ggc agg acg act atc   576
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
            180                 185                 190

aac gac ctc ggc gct gcg tgg atc aat gac agc aac caa agc gaa gta   624
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
        195                 200                 205

tcc aga ttg ttt gaa aga ttt cat ttg gag ggc gag ctc cag agg acg   672
Ser Arg Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
    210                 215                 220

act gga aat tca atc cat caa gca caa gac ggt aca acc act aca gct   720
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225                 230                 235                 240

cct tat ggt gac tcc ttg ctg agc gag gag gtt gca agt gca ctt gcg   768
Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
                245                 250                 255
```

```
gaa ctc ctc ccc gta tgg tct cag ctg atc gaa gag cat agc ctt caa   816
Glu Leu Leu Pro Val Trp Ser Gln Leu Ile Glu Glu His Ser Leu Gln
            260                 265                 270

gac ctc aag gcg agc cct cag gcg aag cgg ctc gac agt gtg agc ttc   864
Asp Leu Lys Ala Ser Pro Gln Ala Lys Arg Leu Asp Ser Val Ser Phe
        275                 280                 285

gcg cac tac tgt gag aag gaa cta aac ttg cct gct gtt ctc ggc gta   912
Ala His Tyr Cys Glu Lys Glu Leu Asn Leu Pro Ala Val Leu Gly Val
    290                 295                 300

gca aac cag atc aca cgc gct ctg ctc ggt gtg gaa gcc cac gag atc   960
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305                 310                 315                 320

agc atg ctt ttt ctc acc gac tac atc aag agt gcc acc ggt ctc agt  1008
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
                325                 330                 335

aat att ttc tcg gac aag aaa gac ggc ggg cag tat atg cga tgc aaa  1056
Asn Ile Phe Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
            340                 345                 350

aca ggt atg cag tcg att tgc cat gcc atg tca aag gaa ctt gtt cca  1104
Thr Gly Met Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu Val Pro
        355                 360                 365

ggc tca gtg cac ctc aac acc ccc gtc gct gaa att gag cag tcg gca  1152
Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala
    370                 375                 380

tcc ggc tgt aca gta cga tcg gcc tcg ggc gcc gtg ttc cga agc aaa  1200
Ser Gly Cys Thr Val Arg Ser Ala Ser Gly Ala Val Phe Arg Ser Lys
385                 390                 395                 400

aag gtg gtg gtt tcg tta ccg aca acc ttg tat ccc acc ttg aca ttt  1248
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Thr Phe
                405                 410                 415

tca cca cct ctt ccc gcc gag aag caa gca ttg gcg gaa aat tct atc  1296
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Asn Ser Ile
            420                 425                 430

ctg ggc tac tat agc aag ata gtc ttc gta tgg gac aag ccg tgg tgg  1344
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Lys Pro Trp Trp
        435                 440                 445

cgc gaa caa ggc ttc tcg ggc gtc ctc caa tcg agc tgt gac ccc atc  1392
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
    450                 455                 460

tca ttt gcc aga gat acc agc atc gac gtc gat cga caa tgg tcc att  1440
Ser Phe Ala Arg Asp Thr Ser Ile Asp Val Asp Arg Gln Trp Ser Ile
465                 470                 475                 480

acc tgt ttc atg gtc gga gac ccg gga cgg aag tgg tcc caa cag tcc  1488
```

```
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
                485                 490                 495

aag cag gta cga caa aag tct gtc tgg gac caa ctc cgc gca gcc tac   1536
Lys Gln Val Arg Gln Lys Ser Val Trp Asp Gln Leu Arg Ala Ala Tyr
            500                 505                 510

gag aac gcc ggg gcc caa gtc cca gag ccg gcc aac gtg ctc gaa atc   1584
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
        515                 520                 525

gag tgg tcg aag cag cag tat ttc caa gga gct ccg agc gcc gtc tat   1632
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr
    530                 535                 540

ggg ctg aac gat ctc atc aca ctg ggt tcg gcg ctc aga acg ccg ttc   1680
Gly Leu Asn Asp Leu Ile Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545                 550                 555                 560

aag agt gtt cat ttc gtt gga acg gag acg tct tta gtt tgg aaa ggg   1728
Lys Ser Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
                565                 570                 575

tat atg gaa ggg gcc ata cga tcg ggt caa cga ggt gct gca gaa gtt   1776
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
            580                 585                 590

gtg gct agc ctg gtg cca gca gca tag                              1803
Val Ala Ser Leu Val Pro Ala Ala
        595                 600
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<210> 21
<211> 600
<212> PRT
<213> Exophiala spinifera

<400> 21

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Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Val Ala Ser Pro
 1               5                  10                  15
Ala Gly Tyr Ser His Val Gly Val Gly Pro Asp Gly Gly Arg Tyr Val
            20                  25                  30
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Ser Gly Val Thr Asp Pro
        35                  40                  45
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
    50                  55                  60
Leu Ala Ala Val Gly Ala Thr Ser Asn Asp Val Thr Lys Leu Asn Tyr
65                  70                  75                  80
Tyr Ile Val Asp Tyr Ala Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                85                  90                  95
Leu Lys Ala Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100                 105                 110
Pro Val Ser Ala Leu Ser Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
        115                 120                 125
Thr Ala Leu Val Pro Gly His Thr Thr Pro Asp Asn Val Ala Asp Val
    130                 135                 140
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
```

145 150 155 160
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
165 170 175
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
180 185 190
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
195 200 205
Ser Arg Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
210 215 220
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225 230 235 240
Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
245 250 255
Glu Leu Leu Pro Val Trp Ser Gln Leu Ile Glu Glu His Ser Leu Gln
260 265 270
Asp Leu Lys Ala Ser Pro Gln Ala Lys Arg Leu Asp Ser Val Ser Phe
275 280 285
Ala His Tyr Cys Glu Lys Glu Leu Asn Leu Pro Ala Val Leu Gly Val
290 295 300
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305 310 315 320
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
325 330 335
Asn Ile Phe Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
340 345 350
Thr Gly Met Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu Val Pro
355 360 365
Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala
370 375 380
Ser Gly Cys Thr Val Arg Ser Ala Ser Gly Ala Val Phe Arg Ser Lys
385 390 395 400
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Thr Phe
405 410 415
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Asn Ser Ile
420 425 430
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Lys Pro Trp Trp
435 440 445
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
450 455 460
Ser Phe Ala Arg Asp Thr Ser Ile Asp Val Asp Arg Gln Trp Ser Ile
465 470 475 480
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
485 490 495
Lys Gln Val Arg Gln Lys Ser Val Trp Asp Gln Leu Arg Ala Ala Tyr
500 505 510
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
515 520 525
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr
530 535 540
Gly Leu Asn Asp Leu Ile Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545 550 555 560
Lys Ser Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
565 570 575
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
580 585 590
Val Ala Ser Leu Val Pro Ala Ala
595 600

<210> 22
<211> 1803
<212> DNA
<213> Exophiala spinifera

<220>
<221> CDS
<222> (1)...(1803)

<221> misc_feature
<222> (0)...(0)
<223> isolate ESP002_C2

<400> 22
atg gca ctt gca ccg agc tac atc aat ccc cca aac gtc gcc tcc cca 48
Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Val Ala Ser Pro
1 5 10 15

gca ggg tat tcc cac atc ggc gta ggc cca aac gaa gcg agg tat gtg 96
Ala Gly Tyr Ser His Ile Gly Val Gly Pro Asn Glu Ala Arg Tyr Val
20 25 30

aca ata gct gga cag att gga caa gac gct ttg ggc gtg aca gac cca 144
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Leu Gly Val Thr Asp Pro
35 40 45

gcc tac gag aaa cag gtt gcc caa gca ttc gcc aat ctg cga gct tgc 192
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
50 55 60

ctt gct gca gtt gga gcc tct tca aac gac gtc acc aag ctc aat tac 240
Leu Ala Ala Val Gly Ala Ser Ser Asn Asp Val Thr Lys Leu Asn Tyr
65 70 75 80

tac atc gtc gac tac gcc ccg agc aaa ctc acc gca att gga gat ggg 288
Tyr Ile Val Asp Tyr Ala Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
85 90 95

ctg aag tct acc ttt gcc ctt gac agg ctc cct cct tgc acg ctg gtg 336
Leu Lys Ser Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
100 105 110

cca gta ccg gcc ttg gct tca cct gaa tac ctc ttt gag gtt gat gcc 384
Pro Val Pro Ala Leu Ala Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
115 120 125

acg gcg ctg gtg cca gga cac tcg acc cca gac aac gtt gcg gac gtg 432
Thr Ala Leu Val Pro Gly His Ser Thr Pro Asp Asn Val Ala Asp Val
130 135 140

gta gtg gtg ggc gct ggc ttg agc ggt ttg gag acg gca cgc aaa gtc 480
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145 150 155 160

cag gcc gcc ggt ctg tcc tgc ctc gtt ctt gag gcg atg gat cgt gta 528

```
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
                165                 170                 175

ggg gga aag act ctg agc gta caa tcg ggt ccc ggc agg acg act atc   576
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
            180                 185                 190

aac gac ctc ggc gct gcg tgg atc aat gac agc aac caa agc gaa gta   624
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
        195                 200                 205

tcc aga ttg ttt gaa aga ttt cat ttg gag ggc gag ctc cag agg acg   672
Ser Arg Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
    210                 215                 220

acc gga aat tca atc cat caa gca caa gac ggt aca acc act aca gct   720
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225                 230                 235                 240

cct tat ggt gac tcc ccg ctg agc gag gag gtt gca agt gca ctt gcg   768
Pro Tyr Gly Asp Ser Pro Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
                245                 250                 255

gaa ctc ctc ccc gta tgg tct cag ctg atc gaa gag tat agc ctt gaa   816
Glu Leu Leu Pro Val Trp Ser Gln Leu Ile Glu Glu Tyr Ser Leu Glu
            260                 265                 270

gac ccc aag gcg agc cct cag gcg aag cgg ctc gac agt gtg agc ttc   864
Asp Pro Lys Ala Ser Pro Gln Ala Lys Arg Leu Asp Ser Val Ser Phe
        275                 280                 285

gcg cac tac tgt gag aag gac cta aac ttg cct gct gtt ctc agc gtg   912
Ala His Tyr Cys Glu Lys Asp Leu Asn Leu Pro Ala Val Leu Ser Val
    290                 295                 300

gca aac cag atc aca cgc gct ctg ctc ggt gtg gaa gcc cac gag atc   960
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305                 310                 315                 320

agc atg ctt ttt ctc acc gac tac atc aag agt gcc acc ggt ctc agt  1008
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
                325                 330                 335

aat att gtc tcg gac aag aaa gac ggc ggg cag tat atg cga tgc aaa  1056
Asn Ile Val Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
            340                 345                 350

aca ggt atg cag tcg att tgc cat gcc atg tca aag gaa ctt gtt cca  1104
Thr Gly Met Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu Val Pro
        355                 360                 365

ggc tca gtg cac ctc aac acc ccc gtc gct gga att gag cag tcg gcg  1152
Gly Ser Val His Leu Asn Thr Pro Val Ala Gly Ile Glu Gln Ser Ala
    370                 375                 380

tcc ggc tgt ata gta cga tcg gcc tcg ggc gcc gtg ttc cga agc aaa  1200
Ser Gly Cys Ile Val Arg Ser Ala Ser Gly Ala Val Phe Arg Ser Lys
```

```
385                 390                 395                 400

aag gtg gtg gtt tcg tta ccg aca aca ttg tat ccc acc ttg aca ttt   1248
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Thr Phe
                405                 410                 415

tca cca cct ctt ccc gcc gag aag caa gca ttg gcg gaa aaa tct atc   1296
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Lys Ser Ile
            420                 425                 430

ctc ggc tac tat agc aag ata gtc ttc gta tgg gac aac ccg tgg tgg   1344
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Asn Pro Trp Trp
        435                 440                 445

cgc gaa caa ggc ttc tcg ggc gtc ctc caa tcg agc tgt gac ccc atc   1392
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
    450                 455                 460

tca ttt gcc aga gat acc agc atc gaa gtc gat cgg caa tgg tcc att   1440
Ser Phe Ala Arg Asp Thr Ser Ile Glu Val Asp Arg Gln Trp Ser Ile
465                 470                 475                 480

acc tgt ttc atg gtc gga gac ccg gga cgg aag tgg tcc caa cag tcc   1488
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
                485                 490                 495

aag cag gta cga caa aag tct gtc tgg gac caa ctc cgc gca gcc tac   1536
Lys Gln Val Arg Gln Lys Ser Val Trp Asp Gln Leu Arg Ala Ala Tyr
            500                 505                 510

gag aac gcc ggg gcc caa gtc cca gag ccg gcc aac gtg ctc gaa atc   1584
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
        515                 520                 525

gag tgg tcg aag cag cag tat ttc caa gga gct ccg agc gcc gtc tat   1632
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr
    530                 535                 540

ggg ctg aac gat ctc atc aca ctg ggt tcg gcg ctc aga acg ccg ttc   1680
Gly Leu Asn Asp Leu Ile Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545                 550                 555                 560

aag tgt gtt cat ttc gtt gga acg gag acg tct tta gtt tgg aaa ggg   1728
Lys Cys Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
                565                 570                 575

tat atg gaa ggg gcc ata cga tcg ggt caa cga ggt gct gca gaa gtt   1776
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
            580                 585                 590

gtg gct agc ctg gtg cca gca gca tag                              1803
Val Ala Ser Leu Val Pro Ala Ala  *
        595                 600


<210> 23
<211> 600
```

<212> PRT
<213> Exophiala spinifera

<400> 23
Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Val Ala Ser Pro
 1   5   10   15
Ala Gly Tyr Ser His Ile Gly Val Gly Pro Asn Glu Ala Arg Tyr Val
            20   25   30
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Leu Gly Val Thr Asp Pro
        35   40   45
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
    50   55   60
Leu Ala Ala Val Gly Ala Ser Ser Asn Asp Val Thr Lys Leu Asn Tyr
65   70   75   80
Tyr Ile Val Asp Tyr Ala Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                85   90   95
Leu Lys Ser Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100   105   110
Pro Val Pro Ala Leu Ala Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
        115   120   125
Thr Ala Leu Val Pro Gly His Ser Thr Pro Asp Asn Val Ala Asp Val
    130   135   140
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145   150   155   160
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
                165   170   175
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
            180   185   190
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
        195   200   205
Ser Arg Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
    210   215   220
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225   230   235   240
Pro Tyr Gly Asp Ser Pro Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
                245   250   255
Glu Leu Leu Pro Val Trp Ser Gln Leu Ile Glu Glu Tyr Ser Leu Glu
            260   265   270
Asp Pro Lys Ala Ser Pro Gln Ala Lys Arg Leu Asp Ser Val Ser Phe
        275   280   285
Ala His Tyr Cys Glu Lys Asp Leu Asn Leu Pro Ala Val Leu Ser Val
    290   295   300
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305   310   315   320
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
                325   330   335
Asn Ile Val Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
            340   345   350
Thr Gly Met Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu Val Pro
        355   360   365
Gly Ser Val His Leu Asn Thr Pro Val Ala Gly Ile Glu Gln Ser Ala
    370   375   380
Ser Gly Cys Ile Val Arg Ser Ala Ser Gly Ala Val Phe Arg Ser Lys
385   390   395   400
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Thr Phe
                405   410   415
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Lys Ser Ile

```
                420                 425                 430
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Asn Pro Trp Trp
        435                 440                 445
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
    450                 455                 460
Ser Phe Ala Arg Asp Thr Ser Ile Glu Val Asp Arg Gln Trp Ser Ile
465                 470                 475                 480
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
                485                 490                 495
Lys Gln Val Arg Gln Lys Ser Val Trp Asp Gln Leu Arg Ala Ala Tyr
            500                 505                 510
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
        515                 520                 525
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr
    530                 535                 540
Gly Leu Asn Asp Leu Ile Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545                 550                 555                 560
Lys Cys Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
                565                 570                 575
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
            580                 585                 590
Val Ala Ser Leu Val Pro Ala Ala
        595                 600
```

<210> 24
<211> 1803
<212> DNA
<213> Exophiala spinifera

<220>
<221> CDS
<222> (1)...(1803)

<221> misc_feature
<222> (0)...(0)
<223> isolate ESP002_C3

<400> 24

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atg gca ctt gca ccg agc tac atc aat ccc cca aac gtc gcc tcc cca   48
Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Val Ala Ser Pro
 1               5                  10                  15

gca ggg tat tcc cac atc ggc gta ggc cca aac gaa gcg agg tat gtg   96
Ala Gly Tyr Ser His Ile Gly Val Gly Pro Asn Glu Ala Arg Tyr Val
            20                  25                  30

aca ata gct gga cag att gga caa gac gct ttg ggc gtg aca gac cca  144
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Leu Gly Val Thr Asp Pro
        .35                 40                  45

gcc tac gag aaa cag gtt gcc caa gca ttc gcc aat ctg cga gct tgc  192
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
     50                  55                  60

ctt gct gca gtt gga gcc tct tca aac gac gtc acc aag ctc aat tac  240
Leu Ala Ala Val Gly Ala Ser Ser Asn Asp Val Thr Lys Leu Asn Tyr
```

```
 65                  70                  75                  80

tac atc gtc gac tac gcc ccg agc aaa ctc acc gca att gga gat ggg   288
Tyr Ile Val Asp Tyr Ala Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                85                  90                  95

ctg aag tct acc ttt gcc ctt gac agg ctc cct cct tgc acg ctg gtg   336
Leu Lys Ser Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100                 105                 110

cca gta ccg gcc ttg gct tca cct gaa tac ctc ttt gag gtt gac gcc   384
Pro Val Pro Ala Leu Ala Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
        115                 120                 125

acg gcg ctg gtg cca gga cac tcg acc cca gac aac gtt gcg gac gtg   432
Thr Ala Leu Val Pro Gly His Ser Thr Pro Asp Asn Val Ala Asp Val
    130                 135                 140

gta gtg gtg ggc gct ggc ttg agc ggc ttg gag acg gca cgc aaa gtc   480
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145                 150                 155                 160

cag gcc gcc ggt ctg tcc tgc ctc gtt ctt gag gcg atg gat cgt gta   528
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
                165                 170                 175

ggg gga aag act ctg agc gta caa tcg ggt ccc ggc agg acg act atc   576
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
            180                 185                 190

aac gac ctc ggc gct gcg tgg atc aat gac agc aac caa agc gaa gta   624
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
        195                 200                 205

tcc aga ttg ttt gaa aga ttt cat ttg gag ggc gag ctc cag agg acg   672
Ser Arg Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
    210                 215                 220

acc gga aat tca atc cat caa gca caa gac ggt aca acc act aca gct   720
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225                 230                 235                 240

cct tat ggt gac tcc ccg ctg agc gag gag gtt gca agt gca ctt gcg   768
Pro Tyr Gly Asp Ser Pro Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
                245                 250                 255

gaa ctc ctc ccc gta tgg tct cag ctg atc gaa gag tat agc ctt gaa   816
Glu Leu Leu Pro Val Trp Ser Gln Leu Ile Glu Glu Tyr Ser Leu Glu
            260                 265                 270

gac ccc aag gcg agc cct cag gcg aag cgg ctc gac agt gtg agc ttc   864
Asp Pro Lys Ala Ser Pro Gln Ala Lys Arg Leu Asp Ser Val Ser Phe
        275                 280                 285

gcg cac tac tgt gag aag gac cta aac ttg cct gct gtt ctc agc gtg   912
Ala His Tyr Cys Glu Lys Asp Leu Asn Leu Pro Ala Val Leu Ser Val
    290                 295                 300
```

```
gca aac cag atc aca cgc gct ctg ctc ggt gtg gaa gcc cac gag atc   960
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305                 310                 315                 320

agc atg ctt ttt ctc acc gac tac atc aag agt gcc acc ggt ctc agt   1008
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
                325                 330                 335

aat att gtc tcg gac aag aaa gac ggc ggg cag tat atg cga tgc aaa   1056
Asn Ile Val Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
            340                 345                 350

aca ggt atg cag tcg att tgc cat gcc atg tca aag gaa ctt gtt cca   1104
Thr Gly Met Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu Val Pro
        355                 360                 365

ggc tca gtg cac ctc aac acc ccc gtc gct gga att gag cag tcg gcg   1152
Gly Ser Val His Leu Asn Thr Pro Val Ala Gly Ile Glu Gln Ser Ala
    370                 375                 380

tcc ggc tgt ata gta cga tcg gcc tcg ggc gcc gtg ttc cga agc aaa   1200
Ser Gly Cys Ile Val Arg Ser Ala Ser Gly Ala Val Phe Arg Ser Lys
385                 390                 395                 400

aag gtg gtg gtt tcg tta ccg aca aca ttg tat ccc acc ttg aca ttt   1248
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Thr Phe
                405                 410                 415

tca cca cct ctt ccc gcc gag aag caa gca ttg gcg gaa aaa tct atc   1296
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Lys Ser Ile
            420                 425                 430

ctc ggc tac tat agc aag ata gtc ttc gta tgg gac aac ccg tgg tgg   1344
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Asn Pro Trp Trp
        435                 440                 445

cgc gaa caa ggc ttc tcg ggc gtc ctc caa tcg agc tgt gac ccc atc   1392
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
    450                 455                 460

tca ttt gcc aga gat acc agc atc gaa gtc gat cgg caa tgg tcc att   1440
Ser Phe Ala Arg Asp Thr Ser Ile Glu Val Asp Arg Gln Trp Ser Ile
465                 470                 475                 480

acc tgt ttc atg gtc gga gac ccg gga cgg aag tgg tcc caa cag tcc   1488
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
                485                 490                 495

aag cag gta cga caa aag tct gtc tgg gac caa ctc cgc gca gcc tac   1536
Lys Gln Val Arg Gln Lys Ser Val Trp Asp Gln Leu Arg Ala Ala Tyr
            500                 505                 510

gag aac gcc ggg gcc caa gtc cca gag ccg gcc aac gtg ctc gaa atc   1584
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
        515                 520                 525
```

```
gag tgg tcg aag cag cag tat ttc caa gga gct ccg agc gcc gtc tat   1632
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr
    530                 535                 540

ggg ctg aac gat ctc atc aca ctg ggt tcg gcg ctc aga acg ccg ttc   1680
Gly Leu Asn Asp Leu Ile Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545                 550                 555                 560

aag tgt gtt cat ttc gtt gga acg gag acg tct tta gtt tgg aaa ggg   1728
Lys Cys Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
                565                 570                 575

tat atg gaa ggg gcc ata cga tcg ggt caa cga ggt gct gca gaa gtt   1776
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
            580                 585                 590

gtg gct agc ctg gtg cca gca gca tag                              1803
Val Ala Ser Leu Val Pro Ala Ala  *
        595                 600
```

<210> 25
<211> 600
<212> PRT
<213> Exophiala spinifera

<400> 25

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Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Val Ala Ser Pro
 1               5                  10                  15
Ala Gly Tyr Ser His Ile Gly Val Gly Pro Asn Glu Ala Arg Tyr Val
            20                  25                  30
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Leu Gly Val Thr Asp Pro
        35                  40                  45
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
    50                  55                  60
Leu Ala Ala Val Gly Ala Ser Ser Asn Asp Val Thr Lys Leu Asn Tyr
65                  70                  75                  80
Tyr Ile Val Asp Tyr Ala Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                85                  90                  95
Leu Lys Ser Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100                 105                 110
Pro Val Pro Ala Leu Ala Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
        115                 120                 125
Thr Ala Leu Val Pro Gly His Ser Thr Pro Asp Asn Val Ala Asp Val
    130                 135                 140
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145                 150                 155                 160
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
                165                 170                 175
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
            180                 185                 190
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
        195                 200                 205
Ser Arg Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
    210                 215                 220
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225                 230                 235                 240
```

Pro Tyr Gly Asp Ser Pro Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
245 250 255
Glu Leu Leu Pro Val Trp Ser Gln Leu Ile Glu Glu Tyr Ser Leu Glu
260 265 270
Asp Pro Lys Ala Ser Pro Gln Ala Lys Arg Leu Asp Ser Val Ser Phe
275 280 285
Ala His Tyr Cys Glu Lys Asp Leu Asn Leu Pro Ala Val Leu Ser Val
290 295 300
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305 310 315 320
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
325 330 335
Asn Ile Val Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
340 345 350
Thr Gly Met Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu Val Pro
355 360 365
Gly Ser Val His Leu Asn Thr Pro Val Ala Gly Ile Glu Gln Ser Ala
370 375 380
Ser Gly Cys Ile Val Arg Ser Ala Ser Gly Ala Val Phe Arg Ser Lys
385 390 395 400
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Thr Phe
405 410 415
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Lys Ser Ile
420 425 430
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Asn Pro Trp Trp
435 440 445
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
450 455 460
Ser Phe Ala Arg Asp Thr Ser Ile Glu Val Asp Arg Gln Trp Ser Ile
465 470 475 480
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
485 490 495
Lys Gln Val Arg Gln Lys Ser Val Trp Asp Gln Leu Arg Ala Ala Tyr
500 505 510
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
515 520 525
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr
530 535 540
Gly Leu Asn Asp Leu Ile Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545 550 555 560
Lys Cys Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
565 570 575
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
580 585 590
Val Ala Ser Leu Val Pro Ala Ala
595 600

<210> 26
<211> 1803
<212> DNA
<213> Exophiala spinifera

<220>
<221> CDS
<222> (1)...(1803)

<221> misc_feature
<222> (0)...(0)
<223> isolate ESP002_C12

<400> 26

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atg gca ctt gca ccg agc tac atc aat ccc cca aac gtc gcc tcc cca   48
Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Val Ala Ser Pro
 1               5                  10                  15

gca ggg tat tct cac gtc ggc gta ggc cca gac gga ggg agg tat gtg   96
Ala Gly Tyr Ser His Val Gly Val Gly Pro Asp Gly Gly Arg Tyr Val
            20                  25                  30

aca ata gct gga cag att gga caa gac gct tcg ggc gtg aca gac cct   144
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Ser Gly Val Thr Asp Pro
        35                  40                  45

gcc tac gag aaa cag gtt gcc caa gca ttc gcc aat ctg cga gct tgc   192
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
    50                  55                  60

ctt gct gca gtt gga gcc act tca aac gac gtc acc aag ctc aat tac   240
Leu Ala Ala Val Gly Ala Thr Ser Asn Asp Val Thr Lys Leu Asn Tyr
65                  70                  75                  80

tac atc gtc gac tac gcc ccg agc aaa ctc acc gca att gga gat ggg   288
Tyr Ile Val Asp Tyr Ala Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                85                  90                  95

ctg aag gct acc ttt gcc ctt gac agg ctc cct cct tgc acg ctg gtg   336
Leu Lys Ala Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100                 105                 110

cca gtg tcg gcc ttg tct tca cct gaa tac ctc ttt gag gtt gat gcc   384
Pro Val Ser Ala Leu Ser Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
        115                 120                 125

acg gcg ctg gtg ccg gga cac acg acc cca gac aac gtt gcg gac gtg   432
Thr Ala Leu Val Pro Gly His Thr Thr Pro Asp Asn Val Ala Asp Val
    130                 135                 140

gta gtg gtg ggc gct ggc ttg agc ggt ttg gag acg gca cgc aaa gtc   480
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145                 150                 155                 160

cag gcc gcc ggt ctg tcc tgc ctc gtt ctt gag gcg atg gat cgt gta   528
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
                165                 170                 175

ggg gga aag act ctg agc gta caa tcg ggt ccc ggc agg acg act atc   576
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
            180                 185                 190

aac gac ctc ggc gct gcg tgg atc aat gac agc aac caa agc gaa gta   624
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
        195                 200                 205
```

```
tcc aga ttg ttt gaa aga ttt cat ttg gag ggc gag ctc cag agg acg   672
Ser Arg Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
    210                 215                 220

act gga aat tca atc cat caa gca caa gac ggt aca acc act aca gct   720
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225                 230                 235                 240

cct tat ggt gac tcc ttg ctg agc gag gag gtt gca agt gca ctt gcg   768
Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
                245                 250                 255

gaa ctc ctc ccc gta tgg tct cag ctg atc gaa gag cat agc ctt caa   816
Glu Leu Leu Pro Val Trp Ser Gln Leu Ile Glu Glu His Ser Leu Gln
            260                 265                 270

gac ctc aag gcg agc cct cag gcg aag cgg ctc gac agt gtg agc ttc   864
Asp Leu Lys Ala Ser Pro Gln Ala Lys Arg Leu Asp Ser Val Ser Phe
        275                 280                 285

gcg cac tac tgt gag aag gaa cta aac ttg cct gct gtt ctc ggc gta   912
Ala His Tyr Cys Glu Lys Glu Leu Asn Leu Pro Ala Val Leu Gly Val
    290                 295                 300

gca aac cag atc aca cgc gct ctg ctc ggt gtg gaa gcc cac gag atc   960
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305                 310                 315                 320

agc atg ctt ttt ctc acc gac tac atc aag agt gcc acc ggt ctc agt  1008
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
                325                 330                 335

aat att ttc tcg gac aag aaa gac ggc ggg cag tat atg cga tgc aaa  1056
Asn Ile Phe Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
            340                 345                 350

aca ggt atg cag tcg att tgc cat gcc atg tca aag gaa ctt gtt cca  1104
Thr Gly Met Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu Val Pro
        355                 360                 365

ggc tca gtg cac ctc aac acc ccc gtc gct gaa att gag cag tcg gca  1152
Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala
    370                 375                 380

tcc ggc tgt aca gta cga tcg gcc tcg ggc gcc gtg ttc cga agc aaa  1200
Ser Gly Cys Thr Val Arg Ser Ala Ser Gly Ala Val Phe Arg Ser Lys
385                 390                 395                 400

aag gtg gtg gtt tcg tta ccg aca acc ttg tat ccc acc ttg aca ttt  1248
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Thr Phe
                405                 410                 415

tca cca cct ctc ccc gcc gag aag caa gca ttg gcg gaa aat tct atc  1296
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Asn Ser Ile
            420                 425                 430

ctg ggc tac tat agc aag ata gtc ttc gta tgg gac aag ccg tgg tgg  1344
```

```
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Lys Pro Trp Trp
        435                 440                 445

cgc gaa caa ggc ttc tcg ggc gtc ctc caa tcg agc tgt gac ccc atc   1392
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
    450                 455                 460

tca ttt gcc aga gat acc agc atc gac gtc gat cga caa tgg tcc att   1440
Ser Phe Ala Arg Asp Thr Ser Ile Asp Val Asp Arg Gln Trp Ser Ile
465                 470                 475                 480

acc tgt ttc atg gtc gga gac ccg gga cgg aag tgg tcc caa cag tcc   1488
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
                485                 490                 495

aag cag gta cga caa aag tct gtc tgg gac caa ctc cgc gca gcc tac   1536
Lys Gln Val Arg Gln Lys Ser Val Trp Asp Gln Leu Arg Ala Ala Tyr
            500                 505                 510

gag aac gcc ggg gcc caa gtc cca gag ccg gcc aac gtg ctc gaa atc   1584
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
        515                 520                 525

gag tgg tcg aag cag cag tat ttc caa gga gct ccg agc gcc gtc tat   1632
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr
    530                 535                 540

ggg ctg aac gat ctc atc aca ctg ggt tcg gcg ctc aga acg ccg ttc   1680
Gly Leu Asn Asp Leu Ile Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545                 550                 555                 560

aag agt gtt cat ttc gtt gga acg gag acg tct tta gtt tgg aaa ggg   1728
Lys Ser Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
                565                 570                 575

tat atg gaa ggg gcc ata cga tcg ggt caa cga ggt gct gca gaa gtt   1776
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
            580                 585                 590

gtg gct agc ctg gtg cca gca gca tag                              1803
Val Ala Ser Leu Val Pro Ala Ala  *
        595                 600
```

<210> 27
<211> 600
<212> PRT
<213> Exophiala spinifera

<400> 27

```
Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Val Ala Ser Pro
 1               5                  10                  15
Ala Gly Tyr Ser His Val Gly Val Gly Pro Asp Gly Gly Arg Tyr Val
            20                  25                  30
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Ser Gly Val Thr Asp Pro
        35                  40                  45
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
```

```
    50                  55                  60
Leu Ala Ala Val Gly Ala Thr Ser Asn Asp Val Thr Lys Leu Asn Tyr
65                  70                  75                  80
Tyr Ile Val Asp Tyr Ala Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                85                  90                  95
Leu Lys Ala Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100                 105                 110
Pro Val Ser Ala Leu Ser Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
        115                 120                 125
Thr Ala Leu Val Pro Gly His Thr Thr Pro Asp Asn Val Ala Asp Val
    130                 135                 140
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145                 150                 155                 160
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
                165                 170                 175
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
            180                 185                 190
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
        195                 200                 205
Ser Arg Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
    210                 215                 220
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225                 230                 235                 240
Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
                245                 250                 255
Glu Leu Leu Pro Val Trp Ser Gln Leu Ile Glu Glu His Ser Leu Gln
            260                 265                 270
Asp Leu Lys Ala Ser Pro Gln Ala Lys Arg Leu Asp Ser Val Ser Phe
        275                 280                 285
Ala His Tyr Cys Glu Lys Glu Leu Asn Leu Pro Ala Val Leu Gly Val
    290                 295                 300
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305                 310                 315                 320
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
                325                 330                 335
Asn Ile Phe Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
            340                 345                 350
Thr Gly Met Gln Ser Ile Cys His Ala Met Ser Lys Glu Leu Val Pro
        355                 360                 365
Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala
    370                 375                 380
Ser Gly Cys Thr Val Arg Ser Ala Ser Gly Ala Val Phe Arg Ser Lys
385                 390                 395                 400
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Thr Phe
                405                 410                 415
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Asn Ser Ile
            420                 425                 430
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Lys Pro Trp Trp
        435                 440                 445
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
    450                 455                 460
Ser Phe Ala Arg Asp Thr Ser Ile Asp Val Asp Arg Gln Trp Ser Ile
465                 470                 475                 480
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
                485                 490                 495
Lys Gln Val Arg Gln Lys Ser Val Trp Asp Gln Leu Arg Ala Ala Tyr
            500                 505                 510
```

```
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
        515                 520                 525
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr
    530                 535                 540
Gly Leu Asn Asp Leu Ile Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545                 550                 555                 560
Lys Ser Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
                565                 570                 575
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
            580                 585                 590
Val Ala Ser Leu Val Pro Ala Ala
        595                 600
```

<210> 28
<211> 1803
<212> DNA
<213> Rhinocladiella atrovirens

<220>
<221> CDS
<222> (1)...(1803)

<221> misc_feature
<222> (0)...(0)
<223> isolate C1

<400> 28

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atg gca ctt gca ccg agc tac atc aat ccc cca aac ctc gcc tcc cca   48
Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Leu Ala Ser Pro
 1               5                  10                  15

gca ggg tat tcc cac gtc ggc gta ggc cca aac gga ggg agg tat gcg   96
Ala Gly Tyr Ser His Val Gly Val Gly Pro Asn Gly Gly Arg Tyr Ala
            20                  25                  30

aca ata gct gga cag att gga caa gac gct tcg gcc gtg aca gac cct   144
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Ser Ala Val Thr Asp Pro
        35                  40                  45

gcc tac gag aaa cag gtt gcc caa gca ttc gcc aac ctg cga gct tgt   192
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
    50                  55                  60

ctt gct gca gtt gga gcc act tca aac gac att acc aag ctc aat tac   240
Leu Ala Ala Val Gly Ala Thr Ser Asn Asp Ile Thr Lys Leu Asn Tyr
65                  70                  75                  80

tac atc gtc gac tac aac ccg agc aaa ctc acc gca att gga gat ggg   288
Tyr Ile Val Asp Tyr Asn Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                85                  90                  95

ctg aag gct acc ttt gcc ctt gac agg ctc cct cct tgc acg ctg gtg   336
Leu Lys Ala Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100                 105                 110

cca gtg ccg gcc ctg gct tca cct gaa tac ccc ttt gag gtt gat gcc   384
```

```
Pro Val Pro Ala Leu Ala Ser Pro Glu Tyr Pro Phe Glu Val Asp Ala
        115                 120                 125

acg gcg ctg gtt cca gga cac tca acc cca gac aat gtt gcg gac gtg   432
Thr Ala Leu Val Pro Gly His Ser Thr Pro Asp Asn Val Ala Asp Val
    130                 135                 140

gtc gtg gtg ggc gct ggc ttg agc ggt ttg gag acg gca cgc aaa gtc   480
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145                 150                 155                 160

cag gct gcc ggg ctg tcc tgc ctc gtt ctt gag gcg atg gat cgt gtg   528
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
                165                 170                 175

ggg gga aag act ctg agc gta caa tcg ggt ccc ggc agg acg gct atc   576
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Ala Ile
            180                 185                 190

aat gac ctc ggc gct gcg tgg atc aat gac agc aac caa agc gaa gta   624
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
        195                 200                 205

ttc aaa tta ttt gaa aga ttt cat ttg gag ggc gag ctc cag agg acg   672
Phe Lys Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
    210                 215                 220

acc gga aat tca atc cat caa gca caa gac ggt aca acc act aca gct   720
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225                 230                 235                 240

cct tat ggt gat tcc ctg ctg agc gag gag gtt gca agt gca ctc gcg   768
Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
                245                 250                 255

gaa ctc ctt ccc gca tgg tct cag ctg atc gaa gag cat agt ctt gaa   816
Glu Leu Leu Pro Ala Trp Ser Gln Leu Ile Glu Glu His Ser Leu Glu
            260                 265                 270

gac ccc aag gcg agc cct caa gcg aag cag ctc gac agt gtg agc ttc   864
Asp Pro Lys Ala Ser Pro Gln Ala Lys Gln Leu Asp Ser Val Ser Phe
        275                 280                 285

gca cac tac tgt gag aag gat cta agc ttg cct gct gtt ctc ggc gtg   912
Ala His Tyr Cys Glu Lys Asp Leu Ser Leu Pro Ala Val Leu Gly Val
    290                 295                 300

gca aac cag atc aca cgc gct ctg ctc ggt gtg gaa gcc cac gag atc   960
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305                 310                 315                 320

agc atg ctt ttt ctc acc gac tac atc aag agt gcc acc ggt ctc agt  1008
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
                325                 330                 335

aat att gtc tcg gat aag aaa gac ggt ggg cag tat atg cga tgc aaa  1056
Asn Ile Val Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
```

```
                340                 345                 350

aca ggt atg cag tcg ctt tgc cat gcc atg tca aag gaa ctt gtt cca   1104
Thr Gly Met Gln Ser Leu Cys His Ala Met Ser Lys Glu Leu Val Pro
        355                 360                 365

ggc tca gtg cac ctc aac acc ccc gtc gcc gaa att gag cag tcg gca   1152
Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala
    370                 375                 380

tcc ggc tgt aca gta cga tcg gcc tcg ggc ggc gtg ttc cga agt aaa   1200
Ser Gly Cys Thr Val Arg Ser Ala Ser Gly Gly Val Phe Arg Ser Lys
385                 390                 395                 400

aag gtg gtg gtt tcg tta ccg aca acc ttg tat ccc acc ttg ata ttt   1248
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Ile Phe
                405                 410                 415

tca cca cct ctt ccc gcc gag aag caa gca ttg gct gaa aaa tcc atc   1296
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Lys Ser Ile
            420                 425                 430

ctg ggc tac tat agc aag ata gtc ttc gta tgg gac aag ccg tgg tgg   1344
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Lys Pro Trp Trp
        435                 440                 445

cgc gaa caa ggc ttc tcg ggc gtc ctc caa tcg agc tgt gac ccc atc   1392
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
    450                 455                 460

tca ttt gcc aga gat acc agc atc gaa gtc gat cgg caa tgg tcc att   1440
Ser Phe Ala Arg Asp Thr Ser Ile Glu Val Asp Arg Gln Trp Ser Ile
465                 470                 475                 480

acc tgt ttc atg gtc gga gac ccg gga cgg aag tgg tcc caa cag tcc   1488
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
                485                 490                 495

aag cag gta cga cag aag tct gtc tgg aac caa ctc cgc gca gcc tac   1536
Lys Gln Val Arg Gln Lys Ser Val Trp Asn Gln Leu Arg Ala Ala Tyr
            500                 505                 510

gag aac gcc ggg gcc caa gtc cca gag ccg gcc aac gtg ctc gag atc   1584
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
        515                 520                 525

gag tgg tcg aag cag cag tat ttc caa gga gcg ccg agc gtc gtc tat   1632
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Val Val Tyr
    530                 535                 540

ggg ctg aac tgt ctc aac aca ctg ggt tcg gcg ctc aga acg ccg ttc   1680
Gly Leu Asn Cys Leu Asn Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545                 550                 555                 560

aag ggt gtt cat ttc gtt gga acg gag acg tct ttg gtt tgg aaa ggg   1728
Lys Gly Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
                565                 570                 575
```

```
tat atg gaa ggg gcc ata cga tcg ggt cag cga ggc gct gca gaa gtt   1776
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
            580                 585                 590

gtg gct agc ctg gtg cca gca gca tag                               1803
Val Ala Ser Leu Val Pro Ala Ala  *
        595                 600
```

<210> 29
<211> 600
<212> PRT
<213> Rhinocladiella atrovirens

<400> 29

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Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Leu Ala Ser Pro
 1               5                  10                  15
Ala Gly Tyr Ser His Val Gly Val Gly Pro Asn Gly Gly Arg Tyr Ala
            20                  25                  30
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Ser Ala Val Thr Asp Pro
        35                  40                  45
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
    50                  55                  60
Leu Ala Ala Val Gly Ala Thr Ser Asn Asp Ile Thr Lys Leu Asn Tyr
65                  70                  75                  80
Tyr Ile Val Asp Tyr Asn Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                85                  90                  95
Leu Lys Ala Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100                 105                 110
Pro Val Pro Ala Leu Ala Ser Pro Glu Tyr Pro Phe Glu Val Asp Ala
        115                 120                 125
Thr Ala Leu Val Pro Gly His Ser Thr Pro Asp Asn Val Ala Asp Val
    130                 135                 140
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145                 150                 155                 160
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
                165                 170                 175
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Ala Ile
            180                 185                 190
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
        195                 200                 205
Phe Lys Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
    210                 215                 220
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225                 230                 235                 240
Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
                245                 250                 255
Glu Leu Leu Pro Ala Trp Ser Gln Leu Ile Glu Glu His Ser Leu Glu
            260                 265                 270
Asp Pro Lys Ala Ser Pro Gln Ala Lys Gln Leu Asp Ser Val Ser Phe
        275                 280                 285
Ala His Tyr Cys Glu Lys Asp Leu Ser Leu Pro Ala Val Leu Gly Val
    290                 295                 300
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305                 310                 315                 320
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
```

```
                325                 330                 335
Asn Ile Val Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
            340                 345                 350
Thr Gly Met Gln Ser Leu Cys His Ala Met Ser Lys Glu Leu Val Pro
        355                 360                 365
Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala
    370                 375                 380
Ser Gly Cys Thr Val Arg Ser Ala Ser Gly Gly Val Phe Arg Ser Lys
385                 390                 395                 400
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Ile Phe
                405                 410                 415
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Lys Ser Ile
            420                 425                 430
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Lys Pro Trp Trp
        435                 440                 445
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
    450                 455                 460
Ser Phe Ala Arg Asp Thr Ser Ile Glu Val Asp Arg Gln Trp Ser Ile
465                 470                 475                 480
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
                485                 490                 495
Lys Gln Val Arg Gln Lys Ser Val Trp Asn Gln Leu Arg Ala Ala Tyr
            500                 505                 510
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
        515                 520                 525
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Val Val Tyr
    530                 535                 540
Gly Leu Asn Cys Leu Asn Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545                 550                 555                 560
Lys Gly Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
                565                 570                 575
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
            580                 585                 590
Val Ala Ser Leu Val Pro Ala Ala
        595                 600
```

<210> 30
<211> 1803
<212> DNA
<213> Rhinocladiella atrovirens

<220>
<221> CDS
<222> (1)...(1803)

<221> misc_feature
<222> (0)...(0)
<223> isolate C2

<400> 30

```
atg gca ctt gca ccg agc tac atc aat ccc cca aac ctc gcc tcc cca   48
Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Leu Ala Ser Pro
 1               5                  10                  15

gca ggg tat tcc tac gtc ggc gta ggc cca aac gga ggg agg tat gtg   96
Ala Gly Tyr Ser Tyr Val Gly Val Gly Pro Asn Gly Gly Arg Tyr Val
```

```
                20                  25                  30

aca ata gct gga cag att gga caa gac gct tcg gcc gtg aca gac cct   144
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Ser Ala Val Thr Asp Pro
        35                  40                  45

gcc tac gag aaa cag gtt gcc caa gca ttc gcc aac ctg cga gct tgt   192
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
    50                  55                  60

ctt gct gca gtt gga gcc act tca aac gac att acc aag ctc aat tac   240
Leu Ala Ala Val Gly Ala Thr Ser Asn Asp Ile Thr Lys Leu Asn Tyr
65                  70                  75                  80

tac atc gtc gac tac aac ccg agc aaa ctc acc gca att gga gat ggg   288
Tyr Ile Val Asp Tyr Asn Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                85                  90                  95

ctg aag gct acc ttt gcc ctt gac agg ctc cct cct tgc acg ctg gtg   336
Leu Lys Ala Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100                 105                 110

cca gtg ccg gcc ctg gct tca cct gaa tac ctc ttt gag gtt gat gcc   384
Pro Val Pro Ala Leu Ala Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
        115                 120                 125

acg gcg ctg gtt cca gga cac tca acc cca gac aat gtt gcg gac gtg   432
Thr Ala Leu Val Pro Gly His Ser Thr Pro Asp Asn Val Ala Asp Val
    130                 135                 140

gtc gtg gtg ggc gct ggc ttg agc ggt ttg gag acg gca cgc aaa gtc   480
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145                 150                 155                 160

cag gct gcc ggg ctg tcc tgc ctc gtt ctt gag gcg atg gat cgt gtg   528
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
                165                 170                 175

ggg gga aag act ctg agc gta caa tcg ggt ccc ggc agg acg act atc   576
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
            180                 185                 190

aat gac ctc ggc gct gcg tgg atc aat gac agc aac caa agc gaa gta   624
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
        195                 200                 205

ttc aaa tta ttt gaa aga ttt cat ttg gag ggc gag ctc cag agg acg   672
Phe Lys Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
    210                 215                 220

acc gga aat tca atc cat caa gca caa gac ggt aca acc act aca gct   720
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225                 230                 235                 240

cct tat ggt gat tcc ctg ctg agc gag gag gtt gca agt gca ctc gcg   768
Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
                245                 250                 255
```

```
gaa ctc ctt ccc gca tgg tct cag ctg atc gaa gag cat agt ctt gaa   816
Glu Leu Leu Pro Ala Trp Ser Gln Leu Ile Glu Glu His Ser Leu Glu
            260                 265                 270

gac ccc aag gcg agc cct caa gcg aag cag ctc gac agt gtg agc ttc   864
Asp Pro Lys Ala Ser Pro Gln Ala Lys Gln Leu Asp Ser Val Ser Phe
        275                 280                 285

gca cac tac tgt gag aag gat cta aac ttg cct gct gtt ctc ggc gtg   912
Ala His Tyr Cys Glu Lys Asp Leu Asn Leu Pro Ala Val Leu Gly Val
    290                 295                 300

gca aac cag atc aca cgc gct ctg ctc ggt gtg gaa gcc cac gag atc   960
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305                 310                 315                 320

agc atg ttt ttt ctc acc gac tac atc aag agt gcc acc ggt ctc agt   1008
Ser Met Phe Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
                325                 330                 335

aat att gtc tcg gat aag aaa gac ggt ggg cag tat atg cga tgc aaa   1056
Asn Ile Val Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
            340                 345                 350

aca ggt atg cag tcg ctt tgc cat gcc atg tca aag gaa ctt gtt cca   1104
Thr Gly Met Gln Ser Leu Cys His Ala Met Ser Lys Glu Leu Val Pro
        355                 360                 365

ggc tca gtg cac ctc aac acc ccc gtc gcc gaa att gag cag tcg gca   1152
Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala
    370                 375                 380

tcc ggc tgt aca gta cga tcg gcc tcg ggc ggc gtg ttc cga agt aaa   1200
Ser Gly Cys Thr Val Arg Ser Ala Ser Gly Gly Val Phe Arg Ser Lys
385                 390                 395                 400

aag gtg gtg gtt tcg tta ccg aca acc ttg tat ccc acc ttg ata ttt   1248
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Ile Phe
                405                 410                 415

tca cca cct ctt ccc gcc gag aag caa gca ttg gct gaa aaa tcc atc   1296
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Lys Ser Ile
            420                 425                 430

ctg ggc tac tat agc aag ata gtc ttc gta tgg gac aag ccg tgg tgg   1344
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Lys Pro Trp Trp
        435                 440                 445

cgc gaa caa ggc ttc tcg ggc gtc ctc caa tcg agc tgt gac ccc atc   1392
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
    450                 455                 460

tca ttt gcc aga gat acc agc atc gaa gtc gat cgg caa tgg tcc att   1440
Ser Phe Ala Arg Asp Thr Ser Ile Glu Val Asp Arg Gln Trp Ser Ile
465                 470                 475                 480
```

```
acc tgt ttc atg gtc gga gac ccg gga cgg aag tgg tcc caa cag tcc   1488
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
                485                 490                 495

aag cag gta cga cag aag tct gtc tgg aac caa ctc cgc gca gcc tac   1536
Lys Gln Val Arg Gln Lys Ser Val Trp Asn Gln Leu Arg Ala Ala Tyr
            500                 505                 510

gag aac gcc ggg gcc caa gtc cca gag ccg gcc aac gtg ctc gag atc   1584
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
        515                 520                 525

gag tgg tcg aag cag cag tat ttc caa gga gcg ccg agc gcc gtc tat   1632
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr
    530                 535                 540

ggg ctg aac tgt ctc aac aca ctg ggt tcg gcg ctc aga acg ccg ttc   1680
Gly Leu Asn Cys Leu Asn Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545                 550                 555                 560

aag ggt gtt cat ttc gtt gga acg gag acg tct ttg gtt tgg aaa ggg   1728
Lys Gly Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
                565                 570                 575

tat atg gaa ggg gcc ata cga tcg ggt cag cga ggc gct gca gaa gtt   1776
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
            580                 585                 590

gtg gct agc ctg gtg cca gca gca tag                              1803
Val Ala Ser Leu Val Pro Ala Ala  *
        595                 600
```

<210> 31
<211> 600
<212> PRT
<213> Rhinocladiella atrovirens

<400> 31

```
Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Leu Ala Ser Pro
 1               5                  10                  15
Ala Gly Tyr Ser Tyr Val Gly Val Gly Pro Asn Gly Gly Arg Tyr Val
            20                  25                  30
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Ser Ala Val Thr Asp Pro
        35                  40                  45
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
    50                  55                  60
Leu Ala Ala Val Gly Ala Thr Ser Asn Asp Ile Thr Lys Leu Asn Tyr
65                  70                  75                  80
Tyr Ile Val Asp Tyr Asn Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                85                  90                  95
Leu Lys Ala Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100                 105                 110
Pro Val Pro Ala Leu Ala Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
        115                 120                 125
Thr Ala Leu Val Pro Gly His Ser Thr Pro Asp Asn Val Ala Asp Val
    130                 135                 140
```

Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145 150 155 160
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
165 170 175
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
180 185 190
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
195 200 205
Phe Lys Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
210 215 220
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225 230 235 240
Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
245 250 255
Glu Leu Leu Pro Ala Trp Ser Gln Leu Ile Glu Glu His Ser Leu Glu
260 265 270
Asp Pro Lys Ala Ser Pro Gln Ala Lys Gln Leu Asp Ser Val Ser Phe
275 280 285
Ala His Tyr Cys Glu Lys Asp Leu Asn Leu Pro Ala Val Leu Gly Val
290 295 300
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305 310 315 320
Ser Met Phe Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
325 330 335
Asn Ile Val Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
340 345 350
Thr Gly Met Gln Ser Leu Cys His Ala Met Ser Lys Glu Leu Val Pro
355 360 365
Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala
370 375 380
Ser Gly Cys Thr Val Arg Ser Ala Ser Gly Gly Val Phe Arg Ser Lys
385 390 395 400
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Ile Phe
405 410 415
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Lys Ser Ile
420 425 430
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Lys Pro Trp Trp
435 440 445
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
450 455 460
Ser Phe Ala Arg Asp Thr Ser Ile Glu Val Asp Arg Gln Trp Ser Ile
465 470 475 480
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
485 490 495
Lys Gln Val Arg Gln Lys Ser Val Trp Asn Gln Leu Arg Ala Ala Tyr
500 505 510
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
515 520 525
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr
530 535 540
Gly Leu Asn Cys Leu Asn Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545 550 555 560
Lys Gly Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
565 570 575
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
580 585 590
Val Ala Ser Leu Val Pro Ala Ala

595 600

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Met Ala Leu Ala Pro Ser Tyr Ile Asn Pro Pro Asn Leu Ala Ser Pro
 1               5                  10                  15

gca ggg tat tcc cac gtc ggc gta ggc cca aac gga ggg agg tat gtg   96
Ala Gly Tyr Ser His Val Gly Val Gly Pro Asn Gly Gly Arg Tyr Val
            20                  25                  30

aca ata gct gga cag att gga caa gac gct tcg gcc gtg aca gac cct  144
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Ser Ala Val Thr Asp Pro
        35                  40                  45

gcc tac gag aaa cag gtt gcc caa gca ttc gcc aac ctg cga gct tgt  192
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
    50                  55                  60

ctt gct gca gtt gga gcc act tca aac gac att acc aag ctc aat tac  240
Leu Ala Ala Val Gly Ala Thr Ser Asn Asp Ile Thr Lys Leu Asn Tyr
65                  70                  75                  80

tac atc gtc gac tac aac ccg agc aaa ctc acc gca att gga gat ggg  288
Tyr Ile Val Asp Tyr Asn Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                85                  90                  95

ctg aag gct acc ttt gcc ctt gac agg ctc cct cct tgc acg ctg gtg  336
Leu Lys Ala Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100                 105                 110

cca gtg ccg gcc ctg gct tca cct gaa tac ctc ttt gag gtt gat gct  384
Pro Val Pro Ala Leu Ala Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
        115                 120                 125

acg gcg ctg gtt cca gga cac tca acc cca gac aat gtt gcg gac gtg  432
Thr Ala Leu Val Pro Gly His Ser Thr Pro Asp Asn Val Ala Asp Val
    130                 135                 140

gtc gtg gtg ggc gct ggc ttg agc ggt ttg gag acg gca cgc aaa gtc  480
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145                 150                 155                 160
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cag gct gcc ggg ctg tcc tgc ctc gtt ctt gag gcg atg gat cgt gtg   528
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
                165                 170                 175

ggg gga aag act ctg agc gta caa tcg ggt ccc ggc agg acg act atc   576
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
            180                 185                 190

aat gac ctc ggc gct gcg tgg atc aat gac agc aac caa agc gaa gta   624
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
        195                 200                 205

ttc aaa tta ttt gaa aga ttt cat ttg gag ggc gag ctc cag agg acg   672
Phe Lys Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
    210                 215                 220

acc gga aat tca atc cat caa gca caa gac ggt aca acc act aca gct   720
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225                 230                 235                 240

cct tat ggt gat tcc ctg ctg agc gag gag gtt gca agt gca ctc gcg   768
Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
                245                 250                 255

gaa ctc ctt ccc gca tgg tct cag ctg atc gaa gag cat agt ctt gaa   816
Glu Leu Leu Pro Ala Trp Ser Gln Leu Ile Glu Glu His Ser Leu Glu
            260                 265                 270

gac ccc aag gcg agc cct caa gcg aag cag ctc gac agt gtg agc ttc   864
Asp Pro Lys Ala Ser Pro Gln Ala Lys Gln Leu Asp Ser Val Ser Phe
        275                 280                 285

gca cac tac tgt gag aag gat cta aac ttg cct gct gtt ctc ggc gtg   912
Ala His Tyr Cys Glu Lys Asp Leu Asn Leu Pro Ala Val Leu Gly Val
    290                 295                 300

gca aac cag atc aca cgc gct ctg ctc ggt gtg gaa gcc cac gag atc   960
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305                 310                 315                 320

agc atg ctt ttt ctc acc gac tac atc aag agt gcc acc ggt ctc agt  1008
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
                325                 330                 335

aat att gtc tcg gat aag aaa gac ggt ggg cag tat atg cga tgc aaa  1056
Asn Ile Val Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
            340                 345                 350

aca ggt atg cag tcg ctt tgc cat gcc atg tca aag gaa ctt gtt cca  1104
Thr Gly Met Gln Ser Leu Cys His Ala Met Ser Lys Glu Leu Val Pro
        355                 360                 365

ggc tca gtg cac ctc aac acc ccc gtc gcc gaa att gag cag tcg gca  1152
Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala
    370                 375                 380

tcc ggc tgt aca gta cga tcg gcc tcg ggc ggc gtg ttc cga agt aaa  1200
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Ser Gly Cys Thr Val Arg Ser Ala Ser Gly Gly Val Phe Arg Ser Lys
385                 390                 395                 400

aag gtg gtg gtt tcg tta ccg aca acc ttg tat ccc acc ttg ata ttt   1248
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Ile Phe
                405                 410                 415

tca cca cct ctt ccc gcc gag aag caa gca ttg gct gaa aaa tcc atc   1296
Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Lys Ser Ile
            420                 425                 430

ctg ggc tac tat agc aag ata gtc ttc gta tgg gac aag ctg tgg tgg   1344
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Lys Leu Trp Trp
        435                 440                 445

cgc gaa caa ggc ttc tcg ggc gtc ctc caa tcg agc tgt gac ccc atc   1392
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
    450                 455                 460

tca ttt gcc aga gat acc agc atc gaa gtc gat cgg caa tgg tcc att   1440
Ser Phe Ala Arg Asp Thr Ser Ile Glu Val Asp Arg Gln Trp Ser Ile
465                 470                 475                 480

acc tgt ttc atg gtc gga gac ccg gga cgg aag tgg tcc caa cag tcc   1488
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
                485                 490                 495

aag cag gta cga cag aag tct gtc tgg aac caa ctc cgc gca gcc tac   1536
Lys Gln Val Arg Gln Lys Ser Val Trp Asn Gln Leu Arg Ala Ala Tyr
            500                 505                 510

gag aac gcc ggg gcc caa gtc cca gag ccg gcc aac gtg ctc gag atc   1584
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
        515                 520                 525

gag tgg tcg aag cag cag tat ttc caa gga gcg ccg agc gcc gtc tat   1632
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr
    530                 535                 540

ggg ctg aac tgt ctc aac aca ctg ggt tcg gcg ctc aga acg ccg ttc   1680
Gly Leu Asn Cys Leu Asn Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545                 550                 555                 560

aag ggt gtt cat ttc gtt gga acg gag acg tct ttg gtt tgg aaa ggg   1728
Lys Gly Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
                565                 570                 575

tat atg gaa ggg gcc ata cga tcg ggt cag cga ggc gct gca gaa gtt   1776
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
            580                 585                 590

gtg cct agc ctg gtg cca gca gca tag                              1803
Val Pro Ser Leu Val Pro Ala Ala  *
        595                 600
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Ala Gly Tyr Ser His Val Gly Val Gly Pro Asn Gly Gly Arg Tyr Val
            20   25   30
Thr Ile Ala Gly Gln Ile Gly Gln Asp Ala Ser Ala Val Thr Asp Pro
        35   40   45
Ala Tyr Glu Lys Gln Val Ala Gln Ala Phe Ala Asn Leu Arg Ala Cys
    50   55   60
Leu Ala Ala Val Gly Ala Thr Ser Asn Asp Ile Thr Lys Leu Asn Tyr
65   70   75   80
Tyr Ile Val Asp Tyr Asn Pro Ser Lys Leu Thr Ala Ile Gly Asp Gly
                85   90   95
Leu Lys Ala Thr Phe Ala Leu Asp Arg Leu Pro Pro Cys Thr Leu Val
            100   105   110
Pro Val Pro Ala Leu Ala Ser Pro Glu Tyr Leu Phe Glu Val Asp Ala
        115   120   125
Thr Ala Leu Val Pro Gly His Ser Thr Pro Asp Asn Val Ala Asp Val
    130   135   140
Val Val Val Gly Ala Gly Leu Ser Gly Leu Glu Thr Ala Arg Lys Val
145   150   155   160
Gln Ala Ala Gly Leu Ser Cys Leu Val Leu Glu Ala Met Asp Arg Val
                165   170   175
Gly Gly Lys Thr Leu Ser Val Gln Ser Gly Pro Gly Arg Thr Thr Ile
            180   185   190
Asn Asp Leu Gly Ala Ala Trp Ile Asn Asp Ser Asn Gln Ser Glu Val
        195   200   205
Phe Lys Leu Phe Glu Arg Phe His Leu Glu Gly Glu Leu Gln Arg Thr
    210   215   220
Thr Gly Asn Ser Ile His Gln Ala Gln Asp Gly Thr Thr Thr Thr Ala
225   230   235   240
Pro Tyr Gly Asp Ser Leu Leu Ser Glu Glu Val Ala Ser Ala Leu Ala
                245   250   255
Glu Leu Leu Pro Ala Trp Ser Gln Leu Ile Glu Glu His Ser Leu Glu
            260   265   270
Asp Pro Lys Ala Ser Pro Gln Ala Lys Gln Leu Asp Ser Val Ser Phe
        275   280   285
Ala His Tyr Cys Glu Lys Asp Leu Asn Leu Pro Ala Val Leu Gly Val
    290   295   300
Ala Asn Gln Ile Thr Arg Ala Leu Leu Gly Val Glu Ala His Glu Ile
305   310   315   320
Ser Met Leu Phe Leu Thr Asp Tyr Ile Lys Ser Ala Thr Gly Leu Ser
                325   330   335
Asn Ile Val Ser Asp Lys Lys Asp Gly Gly Gln Tyr Met Arg Cys Lys
            340   345   350
Thr Gly Met Gln Ser Leu Cys His Ala Met Ser Lys Glu Leu Val Pro
        355   360   365
Gly Ser Val His Leu Asn Thr Pro Val Ala Glu Ile Glu Gln Ser Ala
    370   375   380
Ser Gly Cys Thr Val Arg Ser Ala Ser Gly Gly Val Phe Arg Ser Lys
385   390   395   400
Lys Val Val Val Ser Leu Pro Thr Thr Leu Tyr Pro Thr Leu Ile Phe
                405   410   415

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Ser Pro Pro Leu Pro Ala Glu Lys Gln Ala Leu Ala Glu Lys Ser Ile
            420                 425                 430
Leu Gly Tyr Tyr Ser Lys Ile Val Phe Val Trp Asp Lys Leu Trp Trp
        435                 440                 445
Arg Glu Gln Gly Phe Ser Gly Val Leu Gln Ser Ser Cys Asp Pro Ile
    450                 455                 460
Ser Phe Ala Arg Asp Thr Ser Ile Glu Val Asp Arg Gln Trp Ser Ile
465                 470                 475                 480
Thr Cys Phe Met Val Gly Asp Pro Gly Arg Lys Trp Ser Gln Gln Ser
                485                 490                 495
Lys Gln Val Arg Gln Lys Ser Val Trp Asn Gln Leu Arg Ala Ala Tyr
            500                 505                 510
Glu Asn Ala Gly Ala Gln Val Pro Glu Pro Ala Asn Val Leu Glu Ile
        515                 520                 525
Glu Trp Ser Lys Gln Gln Tyr Phe Gln Gly Ala Pro Ser Ala Val Tyr
    530                 535                 540
Gly Leu Asn Cys Leu Asn Thr Leu Gly Ser Ala Leu Arg Thr Pro Phe
545                 550                 555                 560
Lys Gly Val His Phe Val Gly Thr Glu Thr Ser Leu Val Trp Lys Gly
                565                 570                 575
Tyr Met Glu Gly Ala Ile Arg Ser Gly Gln Arg Gly Ala Ala Glu Val
            580                 585                 590
Val Pro Ser Leu Val Pro Ala Ala
        595                 600
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